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Task Force on the
Future of the
Canadian Financial
Services Sector

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Canadian Financial Institutions and their Adoption of New Technologies

by
Ernst & Young

September 1998

Research Paper Prepared for the Task Force on the Future
of the Canadian Financial Services Sector



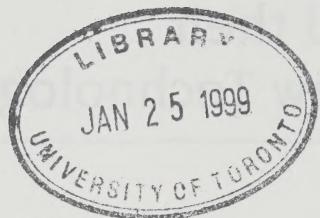
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The views expressed in these research papers
are those of the authors and do not necessarily reflect
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Executive Summary

In this report, we have provided an assessment of the technologies currently in use by Canadian financial institutions as compared with their counterparts in selected benchmark jurisdictions: the United States, Australia, France, United Kingdom, and Germany, with specific reference to five key, leading-edge technologies, including Internet, PC banking, smart cards, data warehousing, document imaging. We have compared the rate of adoption of these technologies in the above-noted benchmark jurisdictions with their rate of adoption by financial institutions in Canada.

Based on this data, we have identified that Canada has, to date, maintained a rate of adoption of technologies which is consistent with the above-noted benchmark jurisdictions. While the regulatory environment has, thus far, not been an issue in the adoption of technologies in Canada, given the rapid development and the further evolution of the above-noted technologies, this situation is unlikely to be sustained. This is because most of the legal and regulatory mechanisms currently in force were conceived in an era before the advent of advanced technologies. In order to ensure the continued development and implementation of technologies in Canada, it is necessary that a regulatory framework exists which facilitates Electronic Commerce. This will help to ensure that Canadian financial institutions are competitively placed in an increasing global economy.

Introduction

Ernst & Young with the assistance of Donahue & Associates, member of Ernst & Young International Ltd, was engaged by the Task Force on the Future of the Canadian Financial Services Sector ("Task Force") to assess the performance of Canadian financial institutions in adopting new technologies. In Part I of this report, we discuss the major trends in technology spending and adoption rates of leading-edge technologies by financial institutions in Canada as compared to selected benchmark jurisdictions: United States, France, United Kingdom, Germany, and Australia. In Part II of the report, we discuss the legal and regulatory factors that may impede the future adoption of emerging technologies.

Our report to the Task Force presents a summary of major survey results relating to five key leading-edge technologies - Internet, smart cards, PC banking, data warehousing, and document imaging - and their implications to the financial services sector.

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Part I: Technology Spending and Adoption Rate – Comparative Results Analysis

Objectives

The purpose of this report is to assist the Task Force in assessing the rate and extent of the adoption of emerging technologies by Canadian financial institutions and the extent to which the regulatory environment facilitates their continued implementation. As some of the technologies are still at early stages of their development, it is important to ensure that, as they evolve, the legislative and regulatory environment permits financial institutions to compete effectively in the global marketplace and to provide customers with innovative financial products and services. If technological innovation is not being implemented, the danger exists that Canadians will not benefit from potential cost savings or may not have access to the full range of products, services and delivery channels available elsewhere. Also, as businesses continue to globalize, the need to ensure that Canadian financial institutions are competitively placed becomes even more crucial. As a result, it is essential to ensure that regulatory rules do not create a competitive disadvantage (and that a favourable business environment exists) for Canadian institutions at home and abroad.

Survey Methodology

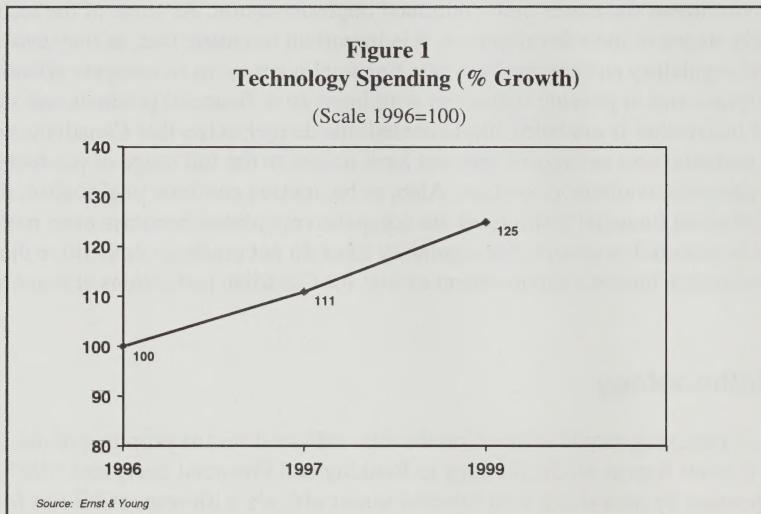
Our analysis of emerging trends is based on the data collected for the purposes of the Ernst & Young 1997 Special Report on Technology in Banking and Financial Services ("1997 Special Report"), supported by interviews with selected senior officers with responsibilities for technology deployment in Canadian financial institutions. The survey for the 1997 Special Report was based on responses from chief technology executives and chief financial officers of bank holding companies and diversified financial services firms in Canada, United States, Australia, United Kingdom, France, and Germany. The 1997 Special Report details how Canadian, American, and international financial institutions are using technology to further develop virtual capabilities and build value networks.

Drawing on the data collected in the preparation of the 1997 Special Report, we have examined the practices and plans of 46 financial institutions from the benchmark jurisdictions as follows: U.S. (19), Australia (10), U.K. (6), France (5), and Germany (6). In addition, executives from 16 of the largest Canadian financial institutions, including the 6 largest banks, participated in this high profile survey.

This report to the Task Force does not claim to be an exhaustive treatment of technology across the financial services sector. In many cases, the survey size is not large enough to be considered a valid statistical sample, however, the analysis is indicative of general trends in the global financial industry.

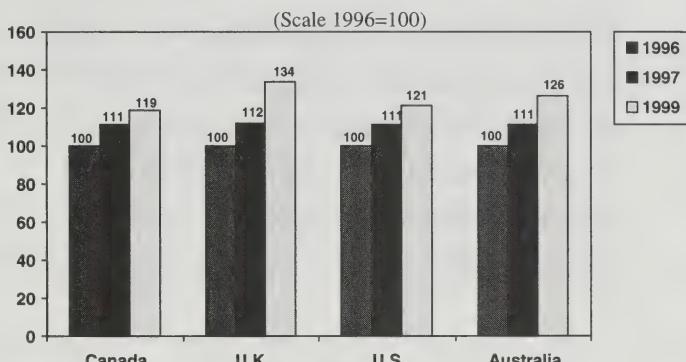
Trends in Technology Spending

Information Technology spending is expected to grow by 11% percent on average in 1997, using 1996 as a base year, according to survey respondents from Canada, U.S., Australia, and U.K. In 1999, information technology spending is expected to increase by 25% percent on average, using 1996 as a base year. The expectation of such high spending growth for 1999 indicates that financial institutions are planning to continuously invest in new technologies and continue to see technological competence as a primary basis for competition (Figure 1).



Survey results show that technology investment continues to move steadily upward from 1996. As evidenced by the substantial investment projections, financial services firms see information technology as a critical factor in creating a successful future. Although technology spending will rise between 1996 and 1999, the percentage increase varies by country, driven by demands such as regulatory changes and a desire to better understand and service customers (Figure 2).

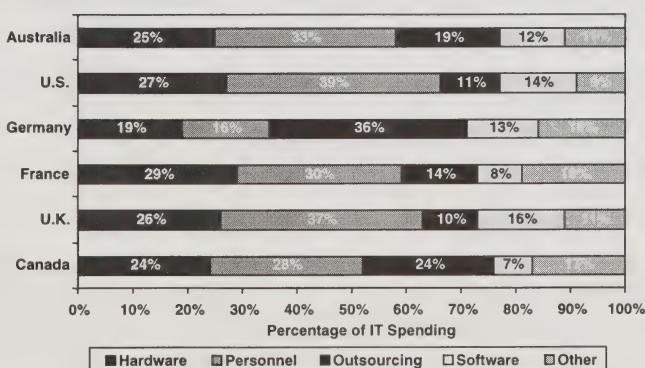
Figure 2
Percentage Growth of Technology Spending
By Country



Source: Ernst & Young

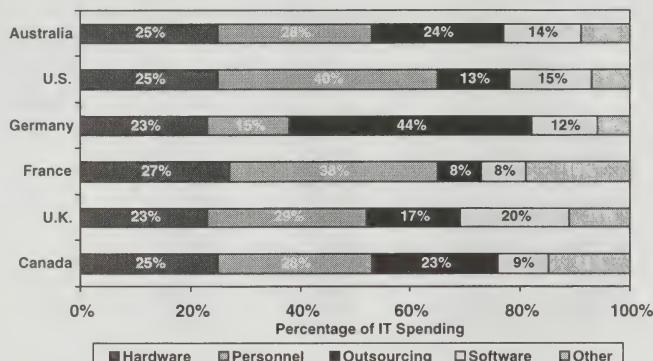
Personnel and hardware costs continue to be the two largest areas of total technology expenditures for all countries studied, with the exception of Germany (Figures 3 & 4). According to the 1997 Special Report, the significant investment in personnel reflects a shortage of skills in two major areas: specialists in migration to a client-server environment and COBOL programmers to address the Year 2000 problem.

Figure 3
Allocation of Technology Spending (1996)



Source: Ernst & Young

Figure 4
Allocation of Technology Spending (1999)

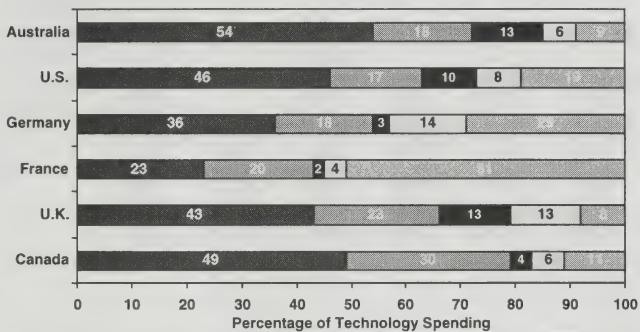


Source: Ernst & Young

The Customer Sales and Service Relationship received top priority in the survey, with respondents allocating on average 42% of their IT spending for this purpose in 1996, and 45% in 1999 (Figures 5 & 6). According to the 1997 Special Report, forward thinking companies are focusing on relationships with their customers, viewing these relationships as assets. Many financial services firms have adopted relationship-based strategies. Financial firms are developing a better understanding of their customers' needs, behaviours, and profitability dynamics. In addition, financial institutions are attempting to develop deep and broad relationships with targeted customers, providing them tailored products and services.

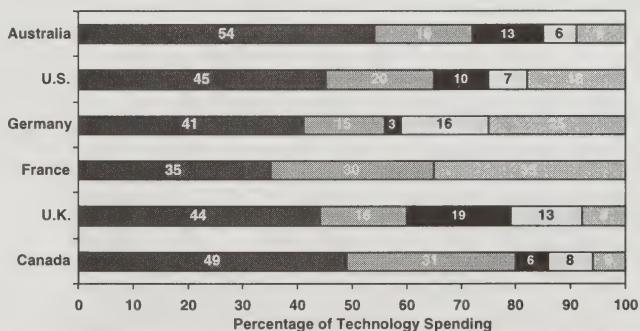
As illustrated in Figures 5 and 6, Canada places more emphasis, relative to the other countries, on product development activities.

Figure 5
Allocation of Technology Spending By Function
(1996)



Source: Ernst & Young

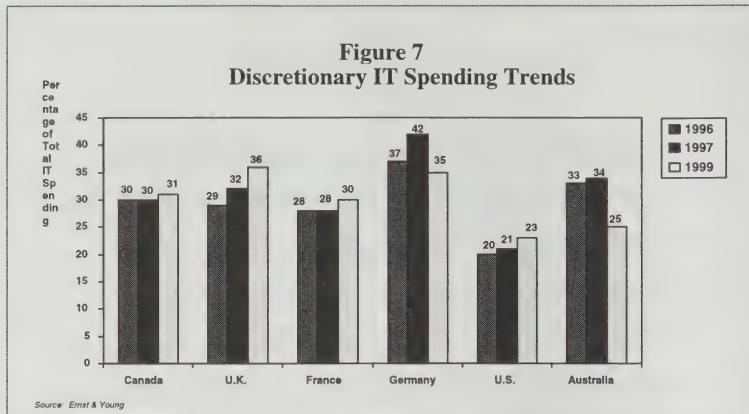
Figure 6
Allocation of Technology Spending By Function
(1999)



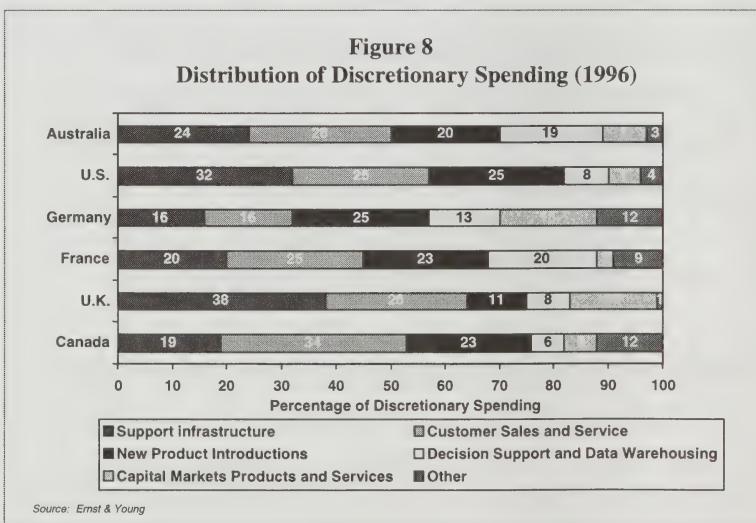
Source: Ernst & Young

Discretionary spending - spending to improve business processes and customer service - are projected to increase between 1996 and 1999 in all of the countries studied (Figure 7).

Discretionary spending in Canada, U.K., France, Germany, and Australia is considerably higher than in the United States; U.S. discretionary spending was 20% of total spending in 1996, and it is projected to rise marginally to 21% and 23% in 1997 and 1999. The growth in discretionary spending in Europe can be attributed in part to the large-scale initiatives of the Economic and Monetary Union (EMU) and the Year 2000.



As defined in the 1997 Special Report, discretionary spending reflects growing investment in Internet technology, data warehousing, smart cards, and call centres. Survey results indicated a significant increase in discretionary spending, with a decisive focus in 1996 on elements of the business that address the customer. Canada, relative to the other benchmark countries, led spending in the area of customer sales and service, with 34% of IT spending allocated for this purpose.



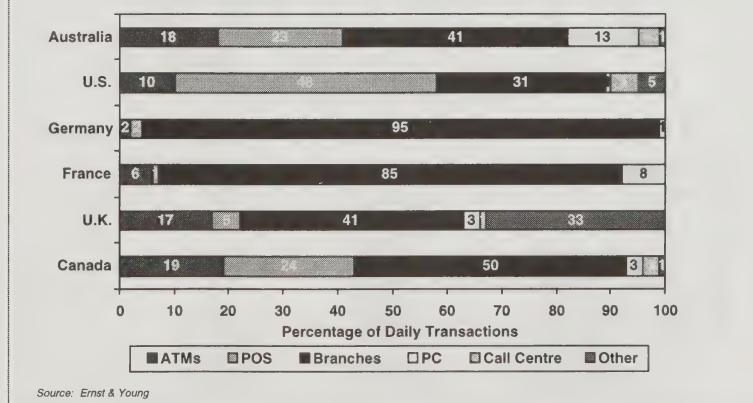
The traditional physical model of banking - with branches of brick and mortar structures - is continuously being reshaped by technology development and changing customer preferences. Financial institutions are building sales and service delivery networks that encompass multiple channels. Alternative delivery channels, ranging from ATMs, call centers, and the Internet are being offered in all countries. According to the 1997 Special Report, the bank branch has taken on new, far less costly forms such as supermarket branches in the United States, post office

branches in Europe, and branch franchises in Australia. Interestingly, franchising or agencies was an early form of banking adopted in Canada in the 1870's¹. Furthermore, according to the Federal Reserve Board, there are more U.S. branches now than in 1990. The number of branches per 1,000 U.S. households has risen from .57 in 1990 to .63 in 1995.

As stated in the 1997 Special Report, customers in Canada have embraced alternative payment mechanisms - such as point-of-sale debit cards and payment by ATM and telephone - faster than all forecasts predicted. The results have been a dramatic reduction in the volume of cheques, from 1.9 billion in 1990 to 1.6 billion in 1995. The growing number of delivery channels provides financial institutions and their customers with new ways of connecting with each other. Although the variety of delivery options is increasing, it is very unlikely for customers to use only one type of delivery channel. As a result, survey findings indicate a shift in the daily transaction volume and delivery channels. Between 1996 and 1999, branch transactions in most countries are anticipated to decrease. Globally, the respondents project a tremendous growth in PC banking and call centre transactions by 1999, with the exception of Germany. Canadian banks are projected to increase POS transactions (24% in 1996 vs. 30% in 1999) and significantly decrease branch transactions (50% in 1996 vs. 34% in 1999) (Figures 9 & 10).

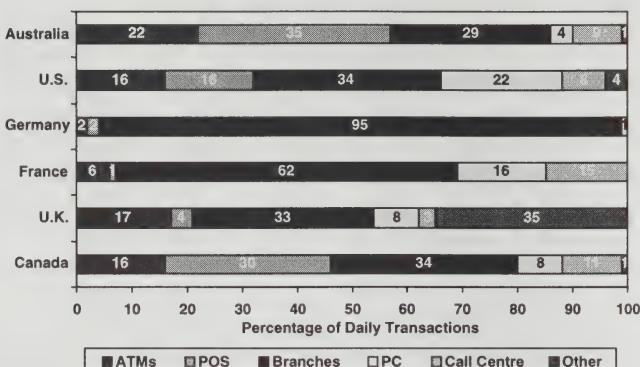
Survey respondents support the trend in delivery channel usage by indicating a shift in priorities for their delivery channel investments. In 1996, the call centre was ranked in the top three of the most important channel investments in every country. By 1999, every benchmark country projects that it will give first priority to PC banking on the Internet (see Appendix II, p.73-74).

Figure 9
Distribution of Retail Transactions/Day (1996)



¹ McDowell D, "Quick to the Frontier", Royal Bank of Financial Group, Page 40 (1993).

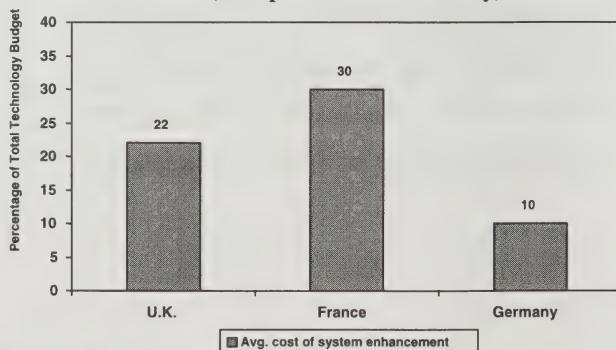
Figure 10
Distribution of Retail Transactions/Day (1999)



Source: Ernst & Young

As indicated in the 1997 Special Report, another issue is the impending Economic and Monetary Union (EMU). The EMU issue for European countries is a primarily business issue, since 85% of the respondents indicated that they would see an increased investment in technology spending due to the EMU mandate. Survey respondents indicate that on average 21% of their technology spending will be invested in system enhancements required by the EMU mandate (Figure 11). France will lead spending in this area with 30% of its IT budget allocated to the EMU requirements.

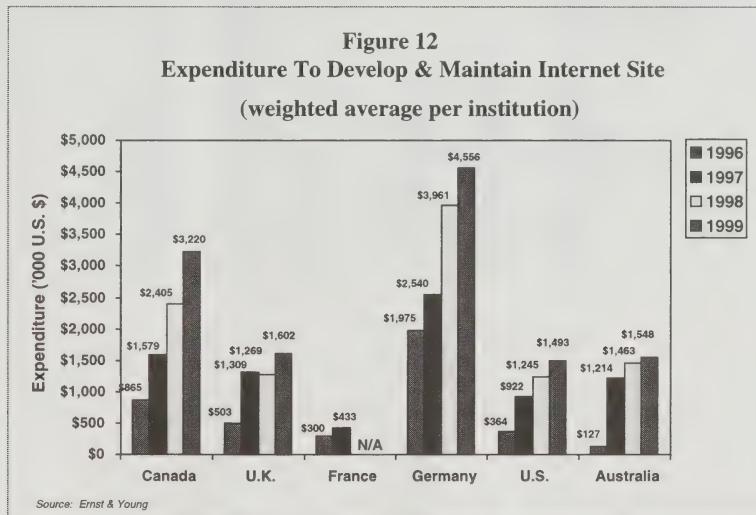
Figure 11
EMU Impact On Investment In Technology
(European Institutions Only)



Source: Ernst & Young

Internet - Issues and Trends

As stated in the 1997 Special, the Internet market is clearly in its very early stages, with issues of standards, security, and payment systems as yet unresolved. However, we are witnessing the early stages of a massive investment that will enable the shift in distribution from branches to the new electronic model. ATMs were the first step, followed by telephone banking and PC banking. The ultimate goal is an electronic transaction among the customer, the vendor, their respective banks, and the payment processor. The transition to electronic commerce will require a massive infrastructural investment in capacity and standards. According to the survey, bank expenditures tied to development and maintenance of Internet capabilities will rise more than threefold over the coming three years (Figure 12).



Most financial institutions already have a presence on the Internet, however, most have merely set up Web pages as an information site. On average, only 1% of transaction processing and 3% of information dissemination is currently taking place over the Internet (Figure 13). Although the Internet market is still in its infancy, financial services companies are among the natural leaders in this arena, and survey respondents anticipate the Internet will be one of the leading technology investments by 1999. Furthermore, Internet transaction processing and information dissemination is projected to increase on average by 8% and 12%, respectively, between 1996 and 1999 (Figure 14). All of the Canadian respondents anticipate to upgrade their Internet capabilities from uses such as sales or promotional Websites to uses such as transaction processing by 1999 (see Appendix II, p.80-83). Most banks, however, are proceeding with caution toward full transactional use of the Internet, as security still remains the primary challenge. Investment in the Internet will enable financial institutions to provide customers with direct processing of transactions. However, this operating model demands a considerable investment in infrastructure. According to the 1997 Special Report, only ATMs, POS and call centres are supported by 24 hours a day, 7 days a week for transaction processing. To accommodate any significant

volume of online transaction processing, 24 hours a day, with access to all business applications, financial services companies must substantially re-engineer their systems and operations.

Figure 13
Percent of Business Over The Internet
(1996)

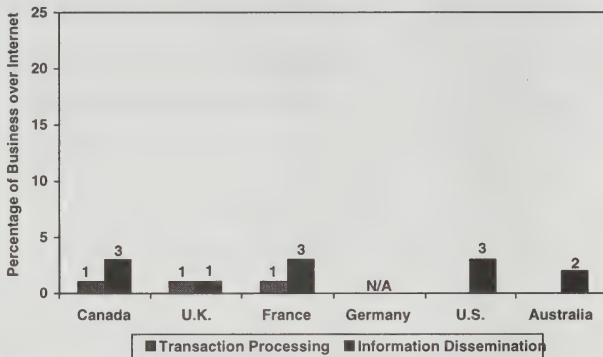
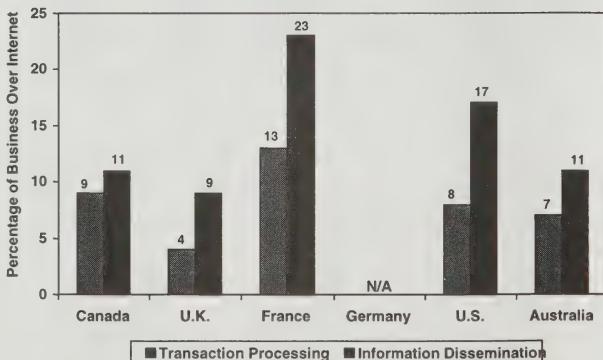


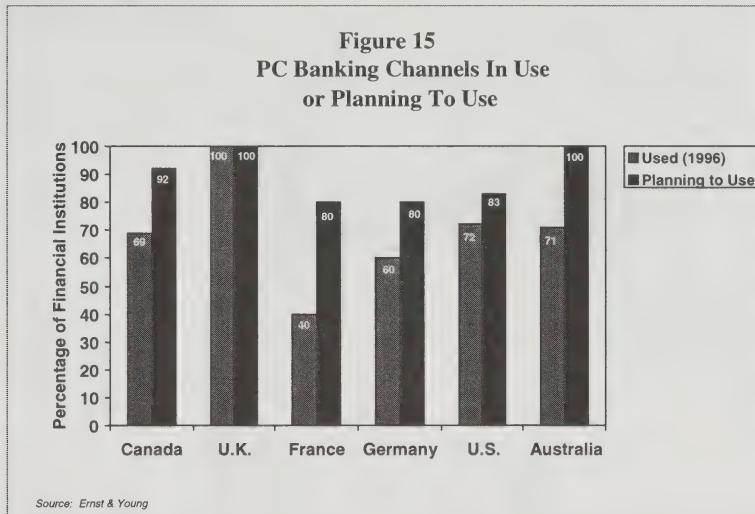
Figure 14
Percent of Business Projected for 1999
Over The Internet



The Internet also allows institutions access to new markets. According to the 1997 Special Report, in the long run, the ability of the Internet to access new markets will be more important to the industry than the Internet's capacity to replace or supplement branch or call centre transactions. In this case, regulatory factors will certainly impact the ability of Canadian financial institutions to compete in a global market.

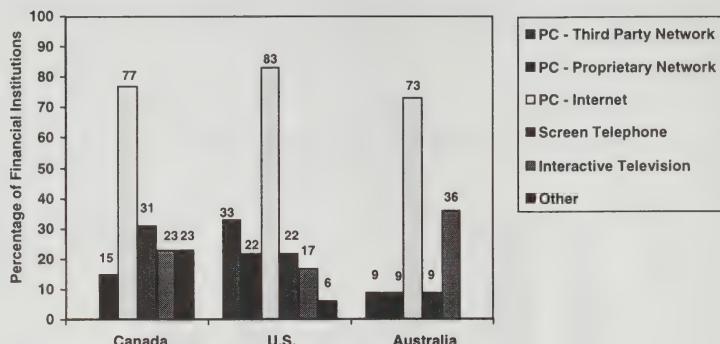
PC Banking - Issues and Trends

PC-based home banking still represents a relatively small portion of customers; nevertheless, more people are using the Internet for informational and transactional services. PC banking is an increasingly important area of technology spending. Most institutions are either currently using or planning to use a variety of PC-based channels (Figure 15).



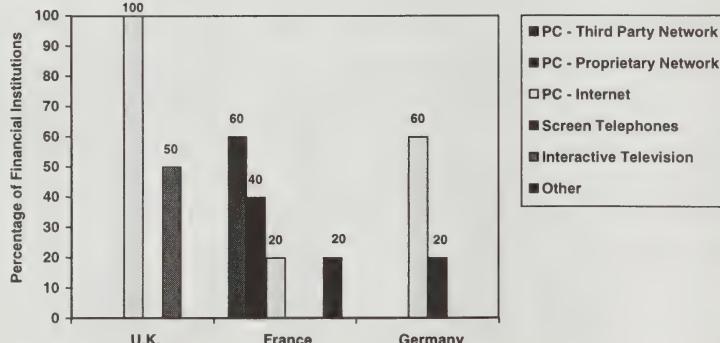
By 1999, the most important channel investment will be PC banking using the Internet (Figures 16 & 17). Right now, fewer than 52% give top priority to PC banking over the Internet, but 88% plan to make it a top priority by 1999 (see Appendix II, p. 71-74). PC banking via third party or proprietary network will decline in usage, globally, whereas PC banking via the Internet will increase by 50% over the next two years. In Canada, the number of banks planning to use interactive television and screen telephone channels is projected to increase by 15% and 8%, respectively (see Appendix II, p.86-89).

Figure 16
PC Banking Channels Planning To Use



Source: Ernst & Young

Figure 17
PC Banking Channels Planning To Use
(Cont'd)



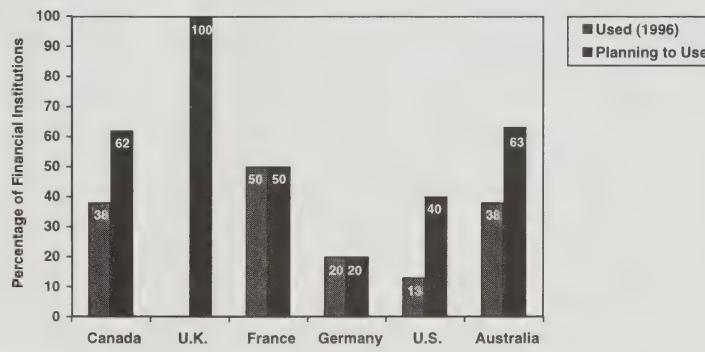
Source: Ernst & Young

According to the 1997 Special Report, one reason so many financial services firms are investing huge sums in home banking is that it has considerable potential for stabilizing the costs of back office operations. Before, home banking customer requests could only be fulfilled by people in back offices. For example, fulfillment of a fund transfer involved a phone call, followed by the manual issuance of a debit ticket and a credit ticket. Home banking bypasses these interventions and allows a customer to make a direct entry in the bank's computer system. Similarly, providing online prospectuses will save steps such as stocking, retrieving, and mailing.

Smart Cards - Issues and Trends

Smart card technology usage is on the rise, particularly in Canada, U.S., and Australia (Figure 18). Use of smart cards is strong in Europe, as smart cards are already offered in many countries in Europe with initiatives such as the Mondex project (a joint venture of National Westminster Bank, Midland Bank, and British Telecom) and the Conditional Access for Europe (CAFE) project of the European Commission. In North America and Australia, pilots of these chip-embedded cards that combine chequing, charging, and cash withdrawal capabilities is under way or soon to begin in most areas. Pilots in Canada and the United States of the Mondex and Visa smart cards will expand their use to thousands of North American consumers, helping to increase international acceptance of this technology.

Figure 18
Smart Cards Technology In Use
or Planning To Use



Source: Ernst & Young

The upward trend of smart card technology is driven by the variety of applications that smart cards can perform as well as by demand for new electronic payment systems. Smart cards can perform three key functions: information storage and management, authentication, and encryption and decryption. Smart cards are primarily used as extremely portable data storage devices. Authentication determines whether the card allows a transaction to take place. The ability to perform authentication on the integrated circuit (IC) chip card increases security because authentication data does not have to be transmitted. Technology such as magnetic stripe reading requires the host system to authenticate data from the card and then compare it with a value provided by the card user (via a PIN pad). Using an IC chip card offers the ability for the point of interface to enter the user-provided value directly onto the card for comparison. Encryption and decryption allow for the transmission of sensitive information through an unsecured medium with a high degree of security. Smart cards can perform data encryption and decryption within the embedded chip which means that secure data does not need to be

transferred from the card to another device, which reduces the chance of encryption or private key theft².

According to the 1997 Special Report, attributes of smart cards include:

- Smart cards are portable, and at least as secure as a credit card, but, to date, have limited acceptance in Canada.
- Some smart card systems allow anonymous payment options for consumers who may object to their transaction histories being recorded (i.e. similar to cash transactions).

Document Imaging - Issues and Trends

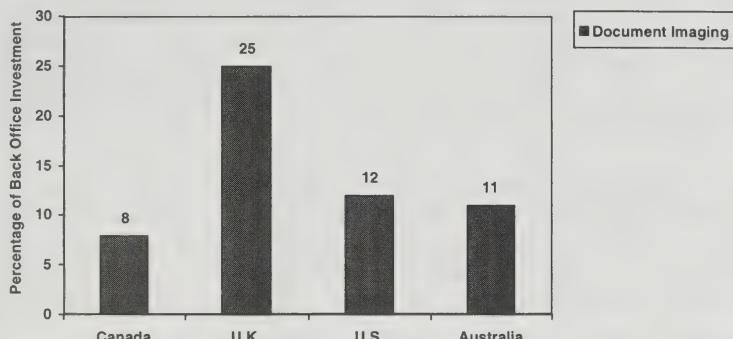
Imaging technology is certainly not new, yet according to the 1997 Special Report, it has still not been implemented in all areas of financial services operations where it can potentially make improvements - image capture from paper forms, cash management, and general archiving. Two new developments in imaging technology are worth noting. First, high speed networks enable companies to collect images remotely and forward them at high rates of speed using optical disk storage or CD-ROM instead of resorting to tapes or disks. Second, new software is available to rapidly locate stored images for purposes of customer service. This increasingly new interest in document imaging will move the financial operations closer to a paperless environment.

Often combined with document imaging in the front office is workflow management software, or groupware, which allows people to share data, perform processing tasks concurrently, and collaborate on computer networks. Though workflow software has existed for twenty years, it has only recently been integrated with imaging to rapidly collect and process data for specific operational purposes. Workflow software can expedite research tasks, such as tracing a specific cheque routing it to the customer. It can streamline processing adjustments that involve several employees, and it can automate customer service functions such as retrieval of statements or loan documents.

Survey results reveal an interest in document imaging, with respondents in Canada, U.K., U.S., and Australia planning to invest in document imaging. Information on plans to invest in this technology in France and Germany was not available. Leading the way to invest in this technology is U.K. (25% of back office investment allocated to document imaging). The percent of document imaging investment in Canada is proportionally lower than document imaging spending in the other countries (Figure 19).

² Feen J., Herschel G., Lett B., "Advanced Technologies & Applications (ATA)", Gartner Group (January 24, 1997)

Figure 19
Document Imaging Investment

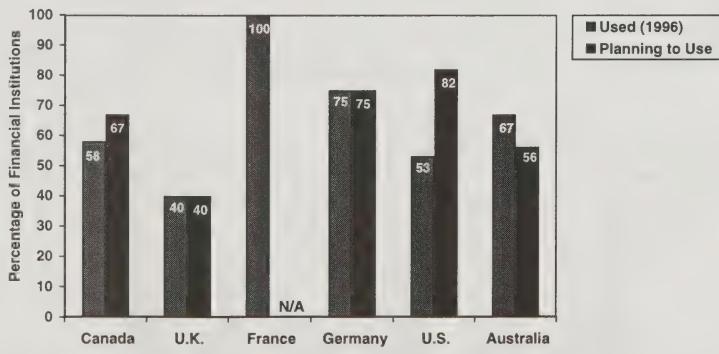


Source: Ernst & Young

Data Warehousing - Issues and Trends

The survey results indicate that data warehousing is becoming an important priority and the use of data warehousing for various applications is expected to increase in all of the countries studied, with the exception of Australia (Figure 20).

Figure 20
**Use of Data Warehousing For
 Various Applications**



Source: Ernst & Young

According to the 1997 Special Report, data warehouses are the industry's latest 'must have' - and the bigger, the better. Data warehousing technologies are rapidly becoming the foundation for

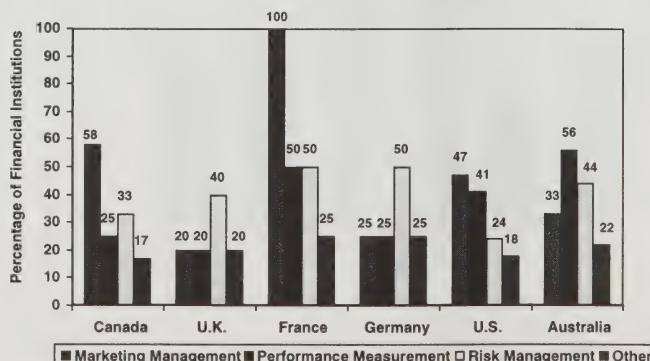
state-of-the-art product management. Data warehouses enable companies to segment the market according to actual or potential buying patterns and to create new product offerings based on this knowledge. Data warehouses can support modelling and complex analysis that enable a company to develop valuable insights into customer behaviours and preferences, as well as superior customer service. By leveraging data warehouse technologies and mining the information they contain, management can bundle products to create value for different customer segments. The data warehouse also enables a financial services company to identify unique offerings for targeted customer groups, as well as to more clearly understand the level of service and advice that various customers desire.

Data warehouses enable an interactive approach to product management. The data warehouse applies information, and the decision support systems allow the organization to analyze 'what if' scenarios and bundle products accordingly. Feedback from the point of sale is captured, fed back into the data warehouse, analyzed and used to refine the product management process. The more a financial services company knows about the habits, preferences, and needs of various customer segments, the more competitively it can package its products to deliver value.

Data warehousing will continue to be used primarily for marketing management and performance measurement by a larger percentage of financial institutions in Canada, U.K., and Germany (Figure 21). A vast majority of financial services respondents are combining data warehousing with decision support systems for marketing management. By using data warehousing with decision support systems, the financial services company can discern the preferences of various market segments, and customize and price different instruments and services for each segment.

The three most commonly cited data warehousing applications are marketing management, performance measurement, and risk management. As external and non-numeric data become an integral part of the data flow, growth in several other subject areas is likely to occur, including human resource management and operational planning.

Figure 21
Data Warehousing In Use For
Various Applications (1996)



Part II: Impediments to the Adoption of New Technologies by Canadian Financial Institutions

Introduction

The above analysis indicates that Canada is keeping pace with the other benchmark countries in the adoption of emerging technologies. The key findings indicate that the five advanced technologies - Internet, Smart Cards, PC Banking, Data Warehousing, and Document Imaging - are currently being used or are in the early piloting stages in Canada. While it appears that regulatory or legal factors in Canada have not, to date, imposed an impediment to the adoption rate of technologies, such factors could become a major impediment to the future adoption rate of technologies, given the direction and speed of technology evolution as well as trends in the financial services sector.

In the coming years, financial institutions will focus more on technologies that can implement their relationship-based strategies, such as data warehousing, PC banking, and the Internet. Financial institutions will need to develop a better understanding of their customers' habits and preferences and to customize product and service packages to meet their needs. The key question is whether the Canadian regulatory and legal environment will facilitate the continued adoption of technologies to meet this challenge.

The adoption of different types of technologies by financial institutions often gives rise to (correspondingly different) legal and regulatory issues. For example, the use of a personal computer to write an electronic cheque raises issues such as the verification of signatures and the customer's ability to stop payment. Websites which offer banking and other financial services online may, similarly, give rise to bank supervisory concerns as well as conflicts of laws, signature requirement, and contractual issues. The placing of a prospectus or other offering materials on a Website raises issues of the adequacy of securities laws to permit such novel delivery methods and jurisdictional issues. The laws or regulations involved may be federal or provincial or foreign in origin or consist of common law rules (relating, for example, to contract formation or legal jurisdiction).

Electronic payment systems are broadly of two kinds: so-called stored-value products, i.e. digital cash and its numerous variants, and electronic chequing and electronic credit cards. Digital cash is typically loaded onto a plastic card or computer hard drive whereas the other two payment methods, or so-called access systems, use electronic means to ensure better (or faster) results from existing payment methods. In particular, the emergence of electronic payment systems gives rise to numerous legal and regulatory issues.

Current and proposed data warehousing practices raise issues pertaining to the ambit and interpretation of the data processing regulations adopted under the *Bank Act* (Canada), privacy issues under the (federal) *Charter of Rights and Freedoms* and provincial human rights legislation, and an increased risk of defamation liability, including trade libel. Data warehousing raises concerns whether banks are fully complying with their common law obligation to preserve

the confidentiality of information received from their customers, as reflected in the Canadian Bankers Association Model Privacy Code.

In addition, the requirements for a writing, signature or physical document (e.g. signature card) under the *Bank Act* (Canada) and numerous other financial statutes may cause uncertainty whether compliance has been achieved in an electronic environment.

Scope of Legislative Improvements

The issues discussed below in some cases point to the inadequacy, or perceived inadequacy, of present statutory laws to permit fully the utilisation of modern financial technology. In such cases, we raise the issue whether legislative intervention is desirable as in some cases the courts will likely supply needed solutions through interpretations which take account of evolving technological capacities.

This analysis is not an exhaustive analysis of the laws and regulations which are affected by the adoption of the various technologies; rather, it is intended to pinpoint certain significant impediments, and suggest where new legislation or legislative amendment may assist to promote a more rapid adoption of emerging financial technologies. Also, for various reasons, not all the impediments discussed below are equally restrictive of financial institutions, or will be perceived by them to be so. We are not suggesting, either, that legislative or judicial intervention is, in all cases, a pre-requisite for the faster adoption or development by financial institutions of new technology. Nonetheless, many of the issues discussed below are legal or regulatory “grey areas” where we feel legislative action would assist to remove an impediment to the adoption or expansion of a given technology.

Legal And Regulatory Impediments to the Adoption of New Technologies

The following factors represent the major impediments to the rapid take-up of Internet/PC banking, stored value card, and data warehousing and mining technologies.

Legal Uncertainties or Grey Areas

Electronic Cash

Digital Cash

The onset of digital cash raises legal issues concerning whether such payments are “money” as defined in common law jurisprudence. Money has the legal hallmark of negotiability, i.e. the irreversible transferability of value to a person paying value therefor without notice of prior defects of title. Generally speaking, the payee or recipient of money receives it free of claims against the payor. The theft or unauthorised use of a stored-value card may, for example, give rise to a claim by the lawful owner of the card that the person who received the electronic tokens or other value transferred by the unauthorised user was not entitled to receive that payment.

Where money in the ordinary sense (bills, notes and coins) are misused under similar circumstances, there would generally be no right to claim it from a person who gave good value therefor.

It is possible that financial institutions may be reluctant to make major investments to promote stored-value products which are intended to closely resemble cash without a strong assurance that such products have the legal character of money and are protected by appropriately worded currency offences under the *Criminal Code* (Canada). Also, banks and trust companies and their customers will likely have concerns whether digital payments will be considered as "cash" for certain types of transactions, for example, in the context of construing bequests made in wills. Legislation could be introduced to address this issue. The introduction in past years of such forms of "money", as travellers' cheques has not prompted such intervention, but such forms of payment have received a restricted use in commercial and retail transactions.

Digital Cash and "Currency"

A related, but separate, issue arises in connection with digital cash and the *Currency Act* (Canada). Having regard to the existing wording of this statute, it seems clear that a stored-value card is not legal tender under that Act (because it is not in the form of coins or bank notes issued by the Bank of Canada). Therefore, a person paying a debt cannot legally require a creditor to accept payment in such form. If, however, a practice develops for businesses and individuals to treat stored-value cards as cash, which may occur for the type of card that is designed to transfer value amongst such persons ("purse to purse" transactions), this issue may become moot. The widespread introduction of electronic money may prompt governments to re-think the existing approach of our currency laws and to clarify existing laws in this regard, which may prompt financial institutions to take quicker action to introduce electronic money.

Canada Deposit Insurance Corporation Act

A further issue arises whether a bank's non-redeemed, aggregate stored-value card liability constitutes an insured deposit under the *Canada Deposit Insurance Corporation Act* (Canada). Preliminary thinking in this regard indicates that a distinction will be drawn between the forms of stored value card where value loaded onto the card is traceable to an account (which will likely be CDIC insured) and forms of stored value card for which tracing is not possible will likely not attract CDIC coverage (e.g. cards that permit purse to purse transactions).

Security

As noted earlier, various security issues and the related legal uncertainties likely constitute impediments to the rapid adoption of e-cash and on-line transactions. While cryptography represents a means of providing security for digital cash and other transactions, additional software and operational security are needed to be certain that digital cash is secure at the conclusion of the transaction. Legal issues that arise in this area include the portability of cryptographic software, access to private cryptographic keys and the efficiency of the *Criminal Code* (Canada) to prosecute computer fraud and computer crime and/or violations of security systems that protect not only the computer but digital cash passing through the computer.

Other legal and regulatory issues

So far, electronic cash is largely unregulated in Canada, although lawyers and regulators are actively looking at its implications, particularly issues surrounding how a transfer of value should be characterised, (is it negotiable; a bank transfer; an assignment; and is it absolute or conditional?); whether it is a deposit for *Bank Act* (Canada), CDIC and other purposes; who should be permitted to issue same (i.e. whether issuance should be restricted to depository institutions); how to control its potential abuse by money launderers, organized crime, counterfeiters, fraudsters and terrorists; and how to protect the privacy of users.

As indicated in a recent article dealing with Electronic Money, Purses and Wallets³:

"The digital revolution is the single most important underlying cause of structural upheaval in banking and should be recognized as such. Regulatory action should acknowledge the driving force and relentless pressure of the converging technologies and the fact that the markets will not be held back. The system needs to be protected from the entry of incompetent and fraudulent participants and policies of incumbents which might put the system at risk."

Regulators need to consider the basic rules governing the issue of electronic purses such as liability for lost cards, resolution of intercepted transactions, and treatment of the values stored on the lost and unclaimed cards. The contract between the purse issuer and the customer cannot be trusted to address all issues satisfactorily and may require to be supplemented either by a safety net of legislation or be covered by the adoption of a voluntary code of practice covering such issues. Consumer protection, privacy and access to and the disclosure of personal information which needs to be safeguarded will also have to be addressed. Policy issues including money creation, money aggregates, issuer default liability, bogus issuers, money laundering and tax evasion will need a lot of thought".

Some steps in this direction have been taken. For example, the Deputies of the G-10 Finance Ministers and Central Bank Governors recently released a report that outlines a broad consensus regarding four key considerations (transparency, financial integrity, technical security and vulnerability to criminal activity) that should help guide national approaches associated with emerging electronic money technologies. Still, authorities in many countries view the application of new regulations as premature, choosing instead to assess the impact of market discipline on the ways in which providers manage their financial and operational risks.

PC Internet Banking

"Uncertainties about regulation of the Internet are probably the biggest obstacle to its rapid take-up in the financial field". (The Internet and Financial Services: Centre for the Study of Financial Innovation Report, 1997.)

³ Chinoy, Shameela, "Electronic Money in Electronic Purses and Wallets", 1996 Banking and Finance Law Review 15.

Specific Issues Relating to the *Bills of Exchange Act*

The current *Bills of Exchange Act* is predicated on the existence of a paper-based payments system; its rules governing stopping of payments and conferring the quality of negotiability likewise rely on a paper-based system. Electronic and magnetic tape payment instructions, and the technology on which they are based, are not likely governed by the *Bills of Exchange Act*, causing gaps in the rules which are applicable to the clearing and settlement of payment instructions. Clearing house rules, in addition to other legal concepts, rely on concepts of negotiability, the rights of a holder in due course and endorsement procedures in the *Bills of Exchange Act*.

"The *Bills of Exchange Act* applies to specific written instruments (bills of exchange, cheques and promissory notes) which meet the requirements of sections 17, 165 and 167 of that Act. Also, the *Bills of Exchange Act* does not deal with many practices facilitated by modern technologies such as remote "presentment" of cheques at data centres, cheque truncation and the posting of accounts on the basis of information provided by the data centre and transmitted electronically. The *Bills of Exchange Act* requires physical "presentment" of a cheque at the branch on which it is drawn. The holder in due course concepts for collecting banks causes a legal vacuum for funds transfers which are not in writing or where physical cheques are not readily presented"⁴.

In addition, a number of legal problems arise because of the absence of statutory direction relating to electronic funds transfer. Difficulty arises from the fact there are no statutory rules which specify when a funds transfer becomes final and irreversible. This causes problems in permitting countermand or stop payment. The Canadian Payments Association rules, therefore, do not permit stop payment for electronic banking, such as at ATM or electronic cheques and bill payment via PC Banking. The instantaneous transfer of funds in electronic funds transfer means there is no practical means of reversing the transaction without risk on the paying bank.

The non-application of the *Bills of Exchange Act* to electronic transactions such as cheque truncation and electronic posting of accounts by information provided through data centres may, as a result, be hindering the more rapid development of electronic banking in Canada.

Contract Issues

A separate series of issues relates to uncertainty about the time and place of making a contract over the Internet, for example, purchasing goods or services financed by a credit card, or buying a term deposit or mortgage through a PC link. These issues can be important when determining the legal rights of parties (for example, when preparing standard-form contractual documentation) or if a party is considering a lawsuit, and are particularly relevant where an international element is involved (as will often be the case with the Internet.) Traditional contract law uses the concepts of offer and acceptance and the (geographic) place, and the time, when a meeting of the minds occurs to determine if, when, and where a contract is formed).

⁴ Manzer Alison R., "Establishing the Banking Relationship - Account Documentation", Canadian Bar Association - Ontario, 1997 Institute of Continuing Legal Education, (January 30, 1997).

For example, issues arise whether an advertisement of a financial institution's products and services on its home page will constitute an offer or an invitation to treat. This is important in determining when and where the contract is formed. If the advertisement constitutes a legal offer, upon its acceptance, the contract will be formed. If, however, the advertisement is merely an "invitation to treat", no offer arises which can be accepted (but rather an offer is solicited from persons accessing the site). As well, legal uncertainty exists surrounding communicating the acceptance to an offer and when that acceptance is deemed to have been communicated to the offeror. Generally, acceptance of an offer is binding only when communication of the acceptance is received by the offeror. Existing law provides various choices, ranging from the postal rule (acceptance is deemed once mailed) to the instantaneous communication rule (deeming acceptance once it is seen or heard by the offeror over an instantaneous medium of communication) to an intermediate approach (acceptance is deemed effective the moment it is sent if the communicator of the acceptance knows the communication is successful).

These issues are germane to the ability of a person to rescind instructions given and what territorial laws (for example, provincial laws pertaining to cost of credit disclosure or other consumer protection) apply to the contract. The uncertainty which surrounds these contract issues is compounded when remote third party servers are involved through whom messages may be routed. Since an acceptance may be received by a third party server and held in its mailbox for retrieval by the recipient offeror, it is possible that the courts may find that the time of acceptance is the time the electronic acceptance was received by the third party server on the offeror's behalf, and the location of the meeting of the minds is the location of the third party server's mailbox. Uncertainties will also arise and may, therefore, inhibit rapid adoption of the technology as a result of, for example, the Internet's unreliability in terms of speed of response, the danger of messages (including payment instructions) being intercepted and potentially altered, and regarding issues pertaining to identifying the person entering into the contract.

Traditionally, these legal uncertainties have been resolved in common law jurisdictions by courts adjudicating individual disputes, a lengthy and often unsatisfactory process due to the potential for conflicting decisions. American case law is already divided, for example, on the issue of whether a person who has accessed a Website in a state other than the one of his residence may be sued in the state where the individual is not resident.

Other jurisdictions are grappling with these problems, as well. The UNCITRAL Model Law on Electronic Commerce, adopted by the United Nations General Assembly in November, 1996, may form a useful guide to Canadian legislators dealing with these issues as it addresses issues of contract formation and timing. The fact that the subject matter of such model law resides largely within provincial jurisdiction is a further complicating factor.

Prohibition against Electronic Sales of Financial Services

Under provincial securities legislation, securities may not be sold except through licensed persons with appropriate training and proficiency to sell these products. Section 13 of the Principles of Regulation Re: Distribution of Mutual Funds by Financial Institutions of the Canadian Securities Administrators (November 4, 1988) provides that:

"Electronic sales. Sales of mutual fund securities through electronic means (e.g. automated teller machines) will not be permitted. As technology advances, the Commission will be prepared to review this restriction at the request of one or more Dealers FIs. This limitation will not be interpreted to restrict sales activity conducted by telephone or other means through which a registered salesperson may communicate directly with a customer. Electronic means may be used to effect redemptions or payments for prior purchases of mutual funds securities."

The Stromberg Report⁵ recommends that clients of a registrant should be able to communicate with the registrants in any manner mutually agreed to, including, by way of ATM or other means of computer electronic or technological access. The Report, however, recommends a number of conditions on such use.

Jurisdiction

Financial institutions offering financial services over the Internet must come to grips with the issue of where a transaction is deemed to take place. This is relevant for two closely-related reasons: first, it determines the regulatory system(s) to which a party or transaction is subject; and secondly, it effects the determination of which legal system governs the contractual relationship between the parties to the transaction. Determining where a cross-border transaction takes place and what law applies to it is no easy task. Matters are further complicated by complex rules of contract law which apply when international contracts with a connection to more than one jurisdiction are involved (e.g. where the party who sponsors a Website is in Country A, the server in Country B and the customer in Country C. Even if a Website includes an express governing law clause, the law of the customer's country may provide for public policy rules which can be invoked to ignore an express choice of law clause.

While the Internet is a new way of providing cross-border services, many of the questions raised are essentially the same as providing services through more conventional means such as telephone order or mail order transactions. What is new is the ease with which customers may communicate with firms in other countries and vice versa. Investors can roam from country to country without leaving their home or office and without realising the legal and regulatory boundaries they are crossing. In the absence of this new technology, it would have been much less common for Canadians to make unsolicited contacts with financial institutions not located here or for Canadian financial institutions to contact persons outside of Canada. As the technology facilitates these, a reassessment of the assumptions underlying the territorial ambit of current regulation is rendered necessary.

In particular, questions arise whether Canadian financial institutions are carrying on the business of banking outside of Canada if their Website appears on the Internet and whether they are, therefore, required to be licensed in those jurisdictions and to comply with local bank and other regulatory and legal requirements, including advertising restrictions. At present, a financial institution setting up an Internet site might select from the following options to ensure regulatory

⁵ Stromberg, Glorianne, "Regulatory Strategies for the Mid-'90s: Recommendations for Regulating Investment Funds in Canada".

compliance (insofar as compliance with every system of law is clearly impossible, and international harmonization is not likely given varying policy considerations and the number of jurisdictions involved):

- (a) it may be possible to establish a means of indicating that a site is intended only for persons in particular jurisdictions and that others will not be protected by their home jurisdiction;
- (b) a second approach would be to use technology to identify the location of the user and restrict access to their Website only to those at whom the site is aimed by blocking on-line inquiries with electronic addresses from outside Canada.

In any event, legislative amendment is necessary to ensure reputable overseas firms are not put at risk of breaching Canadian law when setting up Websites targeted at their home jurisdictions but *are* subject to Canadian law when the Websites are directed to Canadians. Conversely, regulation should be sufficiently stringent to prohibit reputable Canadian firms from engaging in illegal activities abroad.

The increased use of electronic documents to carry out investment transactions highlights another feature of the Internet - the use of search engines to help navigate through vast amounts of information and to sift it for what is relevant. Together with hypertext links, a search engine is capable of bypassing regulatory intent especially when it summarizes the nature and scope of sites in its own words. As well, hypertext links can provide a path through a document for the reader to the information he/she wants to read, bypassing that which is of no interest or which an unscrupulous provider might wish to de-emphasize. Conversely, other Websites can be linked to the financial institution's Website and, therefore, it becomes easy for an investor to lose sight of whose Website he is accessing and who is, therefore, responsible for the information.

It is also unclear whether there will be an obligation on financial institutions to be able to recreate the exact contents of a Web page for any given day or time. Unless a financial institution is able to do so, it will be unable to prove that a complaint based on an older version of the site is not valid. Accordingly, financial institutions will need to be able to evidence ongoing compliance with regulatory requirements.

Privacy Law Requirements

A model Privacy Code was developed by the Canadian Bankers Association and was recently revised in March, 1996 to conform with the Canadian Standards Association new Model Code for the protection of personal information. The Canadian Standards Association Code is intended to establish a voluntary national standard for the protection of personal information in Canada and a standard by which the international community can measure the protection of personal information here. Individual banks are currently revising their own privacy codes to conform to the 1996 CBA Code. In addition, recent revisions to the Bank Act require financial institutions to establish procedures governing the collection, retention, use and disclosure of customer information, to implement a complaints-handling procedure and to report annually on complaints. As banks develop their electronic payment products and services and further invest

in PC/Internet banking, data warehousing and mining and other new technologies, banks will need to be diligent of their obligations with regard to this highly sensitive issue.

For example, one “drawback” to many current forms of electronic payment (including bank credit cards and some smart cards) is that they leave a persistent trail of records. That record trail can be used by many parties other than those involved in the actual transactions, ranging from law enforcement personnel to marketers (for data mining purposes) to would-be or actual litigants. An advantage which is claimed for some digital cash systems is that it can be much more private than paper-based credit or debit transactions. This presents both great opportunities and significant challenges for financial institutions. While it allows consumers to shop without leaving information about themselves, at the same time, the absence of a paper trail makes it easier for money to be laundered and for individuals engaged in illegal activities to evade the efforts of law enforcement officials. Accordingly, uncertainties with regard to the ways in which financial institutions can comply with and implement their privacy obligations may also slow the future rapid up-take of new technologies.

Writing Requirements

Meaning of a “Writing”

The legal requirement of a signature or other paper-based method of authentication is often perceived (at least by many bankers and lawyers) as being an obstacle to the faster adoption of on-line banking technology. Efforts are being made at all levels of government in Canada to eliminate mandatory requirements for hand-written signatures in legislation. Still, the most common form of authentication required by national laws remains a signature. This is commonly understood to mean the manual writing by an individual, whether on his/her own behalf or in a representative capacity, of his/her name or initials (although such an interpretation is not necessarily supported by the definition of signature in the relevant legislation, as appears below).

The word “writing” appears, for example, in the *Bank Act (Canada)* sixty-six times and in the *Insurance Act (Canada)* fifty-two times and is not defined. Similarly, the words “signature” and “to sign” appear forty-three times in the *Bank Act* and thirty-six times in the *Insurance Act* and are not defined once.

The definitions of a writing in the federal, and numerous provincial, *Interpretation Acts* (statutes which establish rules to interpret legislation) suggest that a communication does not have to be written or printed on paper for it to be a “writing”. A typical definition is found in Section 1 of the *Interpretation Act (Ontario)* which provides that a “writing” means something that is “printed, painted, engraved, lithographed, photographed or represented or reproduced by any other mode in a visible form”. It may be argued that a writing displayed on a PC screen is something that is “represented by any other mode in a visible form”. However, rules of statutory interpretation arguably restrict the generality of the words quoted above to specific tangible iterations of a writing. In addition, as the purpose of a writing is to ensure the reliability, credibility and, to some degree, permanence of the document, it is uncertain whether machine readable writings would (at least in some cases) be sufficient to satisfy legislation that requires written evidence of a transaction or written compliance with its provisions. The courts, in certain

circumstances⁶ have adapted to new technologies. For example, a faxed proxy has been held valid in Canada. Still, there are evident differences between a paper-based document such as a fax or telex and one maintained in digital form. A digital writing can, of course, be printed out, but it is designed to be stored on a hard drive, diskette or CD-ROM, and can possibly be altered in ways that do not always make it apparent that a change has been made, or when it has been made. Modern document storage and retrieval systems are designed, moreover, to obviate the paper generation and physical storage of electronically maintained documents to realise cost efficiencies. Legislative amendments could, with appropriate safeguards, remove any uncertainty that electronic messages are acceptable forms of a *signature* or *writing*. The case for doing so seems particularly cogent in the financial arena.

Examples of Legislative Writing Requirements

Statute of Frauds

This statute law of British origin requires that certain contracts be in writing and signed by the parties thereto. Until recently, Section 4 of the *Statute of Frauds* (Ontario) read as follows:

“No action shall be brought to charge any executor or administrator upon any special promise to answer damages out of the executor’s or administrator’s own estate, or to charge any person upon any special promise to answer for the debt, default or miscarriage of any other person, or to charge any person upon any contract or sale of lands, tenements or hereditaments, or any interest in or concerning them, or upon any agreement that is not to be performed within the space of one year from the making thereof, unless the agreement upon which the action is brought, or some memorandum or note thereof is in writing and signed by the party to be charged therewith or some person thereunto lawfully authorized by the party.”

The *Statute Law Amendment Act* (Ontario), which was given Royal Assent on December 9, 1994, amended Section 4 of the *Statute of Frauds* to remove the requirement that any agreement not performed within the space of one year from the making thereof be in writing. The *Statute Law Amendment Act* also repealed Section 5 of the *Sale of Goods Act* (Ontario) to remove the requirement that certain contracts of sale above a stipulated value be in writing. The Explanatory Note for these amendments explains the reason for the change as follows:

“These changes will reduce uncertainty about the legal status of contracts made by electronic data interchange and will allow the public and private sectors to dispense with costly paper backup of these contracts.”

It thus appears in Ontario that many contracts can be proved, including sales of goods regardless of their value, despite being performed over a period of greater than a year. Yet, contracts pertaining to interests in land (e.g. a consumer mortgage) have not been accorded this beneficial treatment. Moreover, numerous other provinces have a Statute of Frauds and Sales of Goods Act

⁶ Courts will look at the overall context of the relationship, the state of the technology at the time the dispute arose, and general industry practice to determine whether an electronic signature will provide sufficient evidence of a transaction to be enforceable.

that have not been amended as in Ontario. Banks and other financial institutions are faced with a patchwork of regulation in this regard: thus, in Ontario, an accepted application made on-line for a term loan, where the term exceeds one year, would appear to be a valid, enforceable contract, but probably not in the provinces which retain the traditional formulation of the Statute of Frauds.

Consumer Protection Laws: Unsolicited Services / Credit Card Laws

In several provinces (Alberta, Manitoba, New Brunswick, Prince Edward Island, and Quebec), legislation provides that lenders may not issue or deliver a credit card to a customer unless the customer has requested a card. In Alberta and Quebec, the request must be in writing before the card may be issued. In British Columbia, Nova Scotia, Ontario and Saskatchewan, such legislation provides that the recipient has no legal obligation to the issuer of an unsolicited credit card unless the recipient acknowledges *in writing* his intention to accept the card (although in Nova Scotia and Ontario, a recipient can acknowledge acceptance of the card by using the card to obtain credit). The requirement of a writing in this regard may be an inhibiting factor towards the expansion of the on-line advertising and sale of credit cards and similar financial products.

Credit Reporting Statutes

In most provinces, credit reporting statutes require that before a lender may validly obtain a credit report, it must give prior notice of that fact to the applicant for credit "*in writing*". In Ontario, for example, the law provides that the notice must be given either in a separate notice or mailed to the customer as part of the application for credit. If it is part of the application, the legislation requires that the notice be in bold face and at least 10 point type.⁷

Federal Financial Institutions Legislation

Throughout the federal legislation governing banks, insurance and trust companies, requirements for disclosure in writing are set out.

For example, Section 440 of the *Bank Act* (Canada) provides that a bank shall not, directly or indirectly, charge or receive any sum for the keeping of an account unless the charge is made by *express agreement* between the bank and the customer. Section 441 of the *Bank Act* requires a bank, on opening an interest-bearing deposit account in Canada in the name of an individual, to disclose the rate of interest applicable to the account and how it is to be calculated. Pursuant to the Disclosure of Charges (Banks) Regulations, a bank must disclose to its customers all charges applicable to personal deposit accounts with the bank by means of a written statement. Where the bank increases the charge applicable to a deposit account with the bank or introduces a new

⁷ In order to address the use of telephone technology, Section 10(3) of the *Ontario Consumer Reporting Act* provides that where a credit is applied for orally, notice may be given orally. While digitally stored messages are sent over analog telephone line, this legislation does not accord well with electronic credit reporting at least where printed out and manually signed and transmitted notifications are not being used together with digitally maintained records.

charge, the bank must disclose the increase or the new charge by means of a *notice in writing*, in the case of a customer to whom a statement of account is sent.

Similarly, Section 445 requires a bank, at the time of account opening, to provide the depositor with “a copy of the account agreement signed by the individual”, information *“in writing”* respecting all charges applicable to the account, information *in writing* respecting how the customer will be notified of any increases in charges and any new charges, information *in writing* regarding the bank’s procedures relating to complaints about the application of any charges applicable to the account, and such other information *in writing* as is required by regulations adopted under the Act.

In addition, Section 450(1) of the *Bank Act* requires that a bank shall not make a loan to a natural person that is repayable in Canada unless the cost of borrowing has been disclosed in the prescribed manner. Section 8 of the Cost of Borrowing Disclosure Regulations, adopted under the *Bank Act* (Canada), requires that such disclosure be “by means of a written statement” or in some cases by a “statement in writing”.

Canada Deposit Insurance Corporation (“CDIC”) Disclosure Requirements

Currently, the Canada Deposit Insurance Corporation Act requires that:

“Section 51(1). No member institution shall issue to any person any instrument evidencing that the person has received or is holding money from or on behalf of a person pursuant to a transaction that does not constitute a deposit or part of a deposit insured under this Act unless the instrument bears the following words on its face:

“The deposit to which this instrument relates is not insured under the *Canada Deposit Insurance Corporation Act*.”

“Le dépôt auquel se rapporte le présent document n'est pas assuré en application de la *Loi sur la société d'assurance-dépôts du Canada*.”

This “stamping requirement” applies to instruments that are “issued”. It is unclear whether it applies when a guaranteed investment certificate or other deposit instrument is sold electronically.

Money Laundering Regulations

The Money Laundering Regulations, adopted under the *Proceeds of Crime (Money Laundering) Act* (Canada), provide that each bank, trust company, loan company and certain other financial institutions shall keep and retain “a signature card in respect of each account holder”, and “every account operating agreement . . . received or created in the normal course of business”.⁸ The Money Laundering Regulations were developed during a time when all transactions took place face to face and were paper-based. They contain no definition of a “signature card”, and appear to

⁸ Section 5(a) and (b) of the Money Laundering Regulations.

contemplate that in the normal course of account opening the financial institution would obtain some paper-based document containing a signature. The financial institution would then have a means of verifying the customer's signature on cheques and withdrawal orders and of building an audit trail. Based on the current wording of the Regulations, it would appear difficult to argue that a signature card can be provided on-line unless a copy was printed out, signed and mailed back to the financial institution. These Regulations also require that financial institutions ascertain the identity of individuals who sign signature cards. Subsections 11(1)(a) and 11(2) of the Regulations state:

"11(1)(a) Every person referred to in any of paragraphs 3(a), (b), and (d) to (e.1) of the Act shall ascertain the identity of every individual who signs a signature card in respect of an account with that person, unless, in respect of a corporate account the signature of which is signed by more than three individuals, the person has ascertained the identity of at least three individuals who signed the card after the coming into force of these Regulations and who remain authorized to act in respect of the account.

(11)(2) For the purposes of subsection (1) the identity of an individual referred to in that subsection shall be ascertained by verifying the identity of the individual by reference to the individual's birth certificate, driver's licence or passport, or to any similar document."

There is uncertainty whether financial institutions which offer PC or Internet banking services and which wish to permit on-line account opening using even the latest screen telephone and interactive television systems can technically comply with these requirements. Moreover, not only does the Internet not lend itself to banks being able to verify customer identity, in the case of e-mail, banks may not be able to ascertain the jurisdiction from which the message has come.

Digital Signatures and the Security of Electronic Financial Transactions

The increasing use of digital documents and signatures and the electronic filing of documents have, in many jurisdictions, including numerous U.S. states, prompted the enactment of legislation which, for example, establishes the conditions under which electronic signatures affixed to communications with public entities will be recognized. A typical case is provided by California, which enacted a law in 1995 providing that an electronic signature shall have the force and effect of a manual signature if, (i) it is unique to the person using it; (ii) it is capable of verification; (iii) it is under the sole control of the person using it; (iv) it is linked to the data in such manner that if the data is changed, the digital signature is invalidated; and (v) it conforms to regulations adopted by California's Secretary of State. The California regulations further provide that the currently acceptable technologies for this purpose include public key cryptography. A procedure is provided to add new technologies to the list of such acceptable technologies.

In addition, UNCITRAL, the United Nations law study forum, has commenced the task of drafting model international digital signature legislation and has issued a report summarizing the results of its preliminary meetings. The European Union is also currently studying the legal aspects of digital signatures, and its study is expected to summarize existing national and EU policies and suggest new legislation where necessary. As well, the Organization for Economic Co-operation and Development ("OECD") has issued guidelines for cryptography policy, which

sets out the principles that countries could follow when devising their own legislation relating to use of cryptography.

The use of Internet technology to provide a broad range of financial services would, it appears, be promoted by amending financial institutions legislation to recognize and establish authentication rules for digital signatures. Alternatively, general legislation could be enacted to establish the infrastructure to implement a general public key-private key cryptographic system.

Document Imaging And Storage

Evidentiary Requirements

It remains unclear whether authentication and proof of original documents stored in digital form can be made under existing evidentiary laws, for example, the *Canada Evidence Act*. Thus, Section 29 of this Act establishes the rules by which copies of an “entry in any book or record kept in any financial institution” shall be admitted in evidence as proof. One of the conditions is that the book or record must be “one of the ordinary books or records of the financial institution”. The federal Department of Justice, in its study entitled “Legal Issues Relating to the Security of Electronic Information”, has noted that some Canadian courts have accepted the reliability of computers without stipulating pre-conditions to the admissibility of their printouts (under Sections 29 and 30 of the *Canada Evidence Act*), and concluded as follows:

“There are very many statutory requirements relating to documents, records, signatures and writing. Although the law is not entirely clear, it is likely that electronic messages will meet statutory requirements and definitions of these terms (e.g. record or business record).

However, it might be desirable for the *Canada Evidence Act* and *Interpretation Act* to clarify this point to avoid piecemeal and inconsistent definitions arising in individual statutes, creating uncertainty for statutes that are not amended. Such amendments might clarify questions concerning hearsay evidence, opinion evidence, originals and copies, and presumed time and place of creation or receipt of messages. The most important point is that courts will have to be convinced about the reliability of electronic messages presented to them and this will require evidence about the circumstances in which the messages were created and preserved and, the reliability of the information technology used in connection with the messages.”

In addition, the kinds of proof a court will require in connection with records that have been converted through a number of formats and software/hardware configurations remains to be determined. As well, where microfilm and optical imaging technologies are concerned, the case law is not clear on whether an image-produced copy will be admissible and credible in court proceedings under the *Canada Evidence Act* after the source of the original record has been disposed of.

Processing Information Outside Canada

Section 245 of the *Bank Act* (Canada) requires banks to maintain and process in Canada any information or data relating to the preparation and maintenance of the records referred to in Section 238 of the Act, unless the Superintendent exempts the bank from the application of the

section. A Processing Application Outside Canada Guideline was published in May, 1992. It provides the circumstances under which the Superintendent of Financial Institutions may issue an order to allow the maintenance and processing outside Canada of any information or data relating to certain records. Notwithstanding that such an exemption is issued, a federally regulated financial institution is required to maintain certain records in Canada (Section 239(1) of the *Bank Act* (Canada); Section 244(1) of the *Trust and Loan Companies Act* (Canada); Sections 262(1) and Section 647(3) of the *Insurance Companies Act* (Canada)). In addition, an exemption order may be revoked, if deemed necessary by the Superintendent following adequate and reasonable notice. As globalization of the financial services industry occurs and financial institutions seek to achieve economies of scale by utilizing cost-effective suppliers of back-office services, increasingly, they will seek to consolidate their back-office processing for all their domestic and international operations in the most cost-effective location. This may well be outside Canada. As a result, the discretionary regulation of such activity by the Superintendent of Financial Institutions in Canada may impede Canadian federally regulated financial institutions from obtaining the economies of scale of consolidated processing technologies.

Bank Powers

While a consideration of the rationale for the continuance of the existing regulatory regime applicable to banks and other financial institutions is beyond the scope of this analysis, it may be noted that some persons in the Canadian banking community consider that investment in and promotion of new financial technologies would be assisted by a relaxing of some of the current restrictions on bank powers, to ensure a return commensurate with the investment and risk required. The inability of banks to, for example, sell tickets (travel, theatre, etc.) via their extensive ATM networks, sell insurance on their Websites, or offer the kinds of securities services which currently can only be offered through their separately incorporated subsidiaries, may be inhibiting the development of, and further investment in, such technologies, at least on the retail side of the business.

Other Factors which affect the Rapid Adoption of Technology

Security Concerns

The current status of the Internet raises serious concerns regarding the security of information and payments. The sprawling nature of the Internet, where transactions pass through many insecure computer networks to reach their destination, raises fears that transactions can be comprised or messages intercepted. In addition, because the Internet is still new, standards are just beginning to emerge. Java, HTML, TCP/IP, and SSL are general standards for application development, presentation standard, telecommunication protocol, and encryption standard. There are also two emerging standards that are specific to financial services, OFX (Open Financial Exchange) and SET (Secure Electronic Transactions). Most recently, OFX has been widely adopted as a protocol for on-line financial transactions, including bill payment, basic banking transactions, and, in the future, on-line trading. Visa and MasterCard

have collaborated on SET, a digital authentication technology being used to secure credit card transaction protocol⁹. SET uses encryption technologies and digital certificates to identify buyers and sellers. It has taken SET a long time to become established. The SET specifications were only recently published and, so far, there are only a few pilot projects testing SET in North America, while other markets in Europe and Japan are only just getting involved in SET projects. The slow adoption of SET is a result of the difficulty in convincing consumers about the safety of transactions over the Internet.

Consumer Behaviour

In Canada, customers have embraced alternative delivery channels - such as point-of-sale debit cards and the use of ATMs and telephone banking - more rapidly than all forecasts predicted. Although alternative delivery channels have been adopted faster than initially expected, the timeframe for Canadians to adopt ATMs was approximately 10 years. Despite nearly two decades of presence, banks are still trying to convince their customers to migrate from using tellers in branches to using ATMs. There are many factors for this consumer behaviour pattern such as general tendency to resist change, the age factor, customer preferences, etc. Many customers tend to resist new technologies due to lack of familiarity and comfort.

Furthermore, retail banking customers are very sensitive about money handling overall and have concerns surrounding loss of control, loss of privacy, account safety, and security. As a result, many customers still need assurance regarding the security of electronic commerce, more particularly, security of transactions over the Internet. Consumers have heard too many stories about security holes in Web browsers and key Internet technologies. Also, the fact that transactions travel across many insecure computer networks to reach their destination, raises the fear that information can be intercepted along the way¹⁰.

As a result, the future of electronic commerce and its wide acceptance is dependent on the public becoming more comfortable with new technologies and security level of transactions over the Internet. SET and other transaction standards could help reduce public concerns about security because standards such as SET require the use of digital certificates to identify buyer and seller. Although financial transaction standards are emerging, the key challenge is to convince consumers that transactions over the Internet are a safe way to purchase products and services¹⁰.

⁹ Ernst & Young, "1997 Special Report, Technology in Banking & Financial Services - Managing the Value Network", Page 61.

¹⁰ Financial Times, "Consumers Still Wary of Security Guarantee in Online Transactions", September 3, 1997.

International Developments

The OECD, in its report on Electronic Commerce (Opportunities and Challenges for Government) has suggested that:

“As a matter of urgency, governments need to clarify the legal definitions, practices and structures that pertain to commercial activities in an electronic environment, and to seek multilateral agreements on critical legal matters, especially the laws regarding residency, agency, liability, auditability, control of databases, unauthorized use of databases and data protection.

Where appropriate, governments should adjust existing laws and regulations so that they apply to “intangible” as well as “material” product environments. They should ensure that all future actions regarding consumer protection laws and regulations are closely co-ordinated with developments in Electronic Commerce.

Recognizing the special characteristics of the commercial environment provided by the Internet, an internationally agreed legal definition is urgently required as to where commercial transactions on the Internet are deemed to have taken place”¹¹.

It recognizes that most of the legal and regulatory mechanisms currently being applied by governments to commercial activity were conceived in an era before the advent of advanced electronic communication systems. Moreover, frameworks of commercial policy, law and regulation are still oriented overwhelmingly to trade in tangible goods. Specifically, the OECD Report recommends that governments play a positive role in, *inter alia*, facilitating the development of Electronic Commerce through the provision of a legal, regulatory and infrastructural environment that encourages the development of Electronic Commerce.

To ensure continued deployment of new technologies, government should evaluate carefully the level of regulatory oversight and the method by which it is applied. In this regard, the Clinton Administration has advocated that governments should avoid undue restrictions on Electronic Commerce and that government should restrict itself to ensuring competition, protecting intellectual property and privacy, preventing fraud, fostering transparency, supporting commercial transactions and facilitating dispute resolution. As well, recognizing the need to facilitate commerce over the Internet on a global basis, the Clinton Administration has recommended the development of a Uniform Commercial Code for Electronic Commerce.

In order to keep pace with international developments, Canada must ensure that its legal and regulatory framework is conducive to new and innovative technologies that facilitate the ways in which commerce will be conducted in the future. This means walking a fine line between ensuring certainty in commercial transactions while avoiding unnecessary restrictions on the evolution of Electronic Commerce.

¹¹ Organization for Economic Cooperation and Development, “Electronic Commerce Opportunities and Challenges for Government”, 1997.

Conclusions

Following are our conclusions relating to the rate of adoption of five leading-edge technologies by Canadian financial institutions compared to selected benchmark jurisdictions, as well as the implication of regulatory and legal issues on the further evolution of these technologies:

1. The trend of technology spending is projected to increase by 25% over the next three years. The level and trend in technology investments indicate that financial institutions view technological competence as a requirement for successfully competing in the marketplace.
2. Based on our assessment, the rate of adoption of technologies by Canadian banks is comparable to that of the benchmark jurisdictions in the areas of PC banking, data warehousing, document imaging, smart cards, and Internet.
3. Financial institutions on a global basis view PC/Internet banking, data warehousing, and smart cards as areas of major focus for technology investment.
4. Regulatory or legal factors have not been, in our view, significant impediments to the adoption of technologies by Canadian financial institutions thus far. However, given the direction and pace of technology evolution, the absence of a regulatory and legal framework in Electronic Commerce could become a major impediment to the further evolution and deployment of new and existing technologies.
5. The following are the main legal uncertainties or grey areas which may impede the continued adoption of technologies in the future:
 - Electronic Cash
 - PC/Internet Banking
 - Writing Requirements
 - Digital Signature and the Security of Electronic Financial Transactions
 - Document Imaging and Storage.
6. Implementation of a regulatory and legal framework in Electronic Commerce will increase the confidence of both customers and financial institutions, thereby increasing the volume of electronic transactions and, therefore, the rate of adoption of advanced technologies.
7. Consistent with OECD (and other international agencies') recommendations, government should avoid undue restrictions on Electronic Commerce and ensure that the nature, extent, and pace of regulation is aligned with international developments in this area. However, as necessary, laws should be enacted (e.g. digital signature laws) or amended to facilitate the provision of a legal, regulatory, and infrastructural environment that encourages the further use and deployment of advanced technologies.

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Appendix I: Definitions of Terms

Financial Institutions

Defined as banks (depository institutions), asset management firms such as mutual fund companies, brokerage firms, and/or insurance companies. - 1997 Special Report Technology in Banking

Discretionary Spending

Spending that could be discontinued and have no immediate operating impact on the financial institution (i.e. all technology related expenditures not associated with maintenance, production support, or basic hardware replacement). - 1997 Special Report Technology in Banking

POS

Point of Sale debit cards allow customers to pay for goods and services using their banking card (also known as 'Interac Direct Payment') by accessing funds that are already in their account at the time of the purchase. The card is "swiped" at the point of sale and consumers authorize the transaction by punching their Personal Identification Number into a PINpad - Interac

Branches - Teller Automation

Automation or enhancements of front end office systems including, teller cash processing, cash management, pass book updates, checking processing, deposit capture (data entry).

Branches - Platform Automation

Automation or enhancements of back office systems - core transaction processing systems - including statements production, accrual and fee calculations, client information, historical transaction data, loan and deposit processing and origination, updating of accounts.

Internet

The Internet exemplifies a global information superhighway or an electronic communication channel, transporting all types of data around the world. It is an open computer network consisting of nearly 4 million UNIX host computers that collectively link over 30 million users. Because the Internet is still so new, standards are just beginning to emerge: Java software is becoming a standard for application development, HTML has emerged as the presentation standard, TCP/IP as the dominant telecommunications protocol, and Netscape's SSL as the encryption standard for Web browsers. - Tower Group

PC Banking

The ability to perform basic banking and personal finance needs on a personal computer. - Gartner Group

PC Banking (proprietary network)

Defined as traditional dial-up service (through a network combination that connects directly to a bank controlled server) offered by financial institutions. - Gartner Group

PC Banking (third party network)

Dial-up service that is offered by another party on behalf of the financial institution. Third Party access such as on-line services (e.g. America On-line, Prodigy, and Compuserve) and software vendors (e.g. Microsoft, Intuit, Mecca) have enabled financial institutions to offer dial-up connections with value added services along with Internet access. - Gartner Group

PC Banking (Internet)

Most recent of the PC interfaces used by financial institutions is the Internet Website, accessible through a browser. Internet browsers are used as remote banking access software. With browsers, the bank does not have to supply the customer with any unique software to initiate or utilize remote banking. End users only need a browser and Internet access. - Tower Group

Data Warehousing

Defined as more than just having the ability to load and store large amounts of data. It also contains complex data models and allows large number of users to issue complex queries and to perform sophisticated analysis. - Gartner Group

Data Mining

Process of discovering meaningful new correlations, patterns, and trends by sifting through large amounts of data stored in repositories, using pattern recognition technologies as well as statistical and mathematical techniques. - Gartner Group

Smart Cards

Cards that have embedded microprocessors, allowing them to perform more sophisticated functions than their magnetic stripe predecessors. Not only can smart cards store considerably more information than magnetic stripe cards, they can actually execute programs that are stored on the card itself. - Tower Group

Document Imaging

Defined as scanning, storing, and displaying technologies used to automate paper intensive processes. Any type of paper can be scanned, the image digitized and indexed for storage, and

later transmitted or retrieved. The technology has great appeal because of the financial industry's enormous quantities of paper. In addition, document imaging is also about optical character recognition (OCR - recognition of printed or written characters by computer), and intelligent character recognition (ICR). - Gartner Group

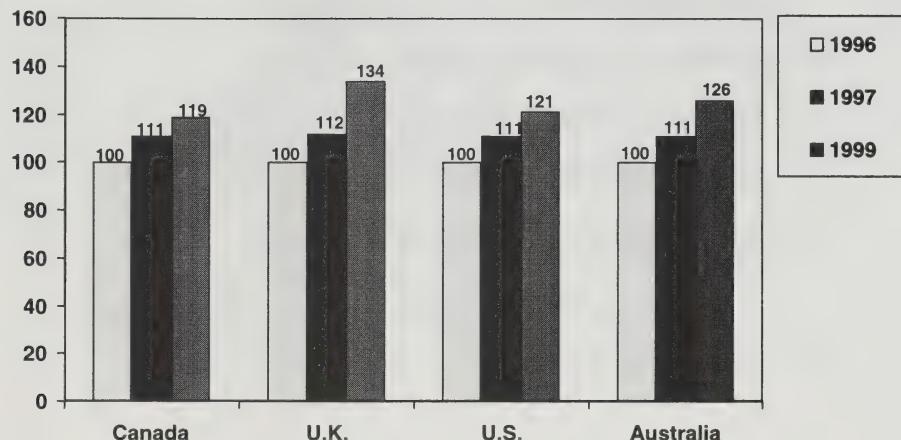
Economic and Monetary Union (EMU)

The EMU states that the members of the European Union use one single currency (the Euro) by 2002. The impact of such mandate is far reaching - cash registers, ATMs, check processing software, and even coin dispensers at Laundromats will have to accept and account for the new currency. - 1997 Special Report Technology in Banking.

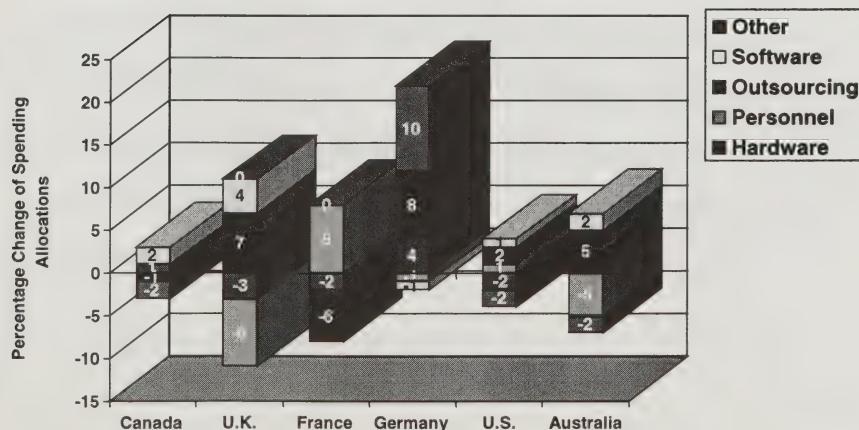
Appendix II: Comparative Results Analysis

Technology Spending (% Growth)

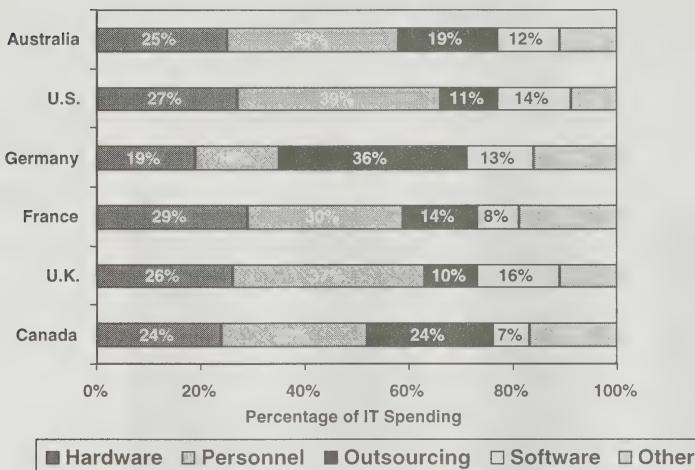
(Scale 1996=100)



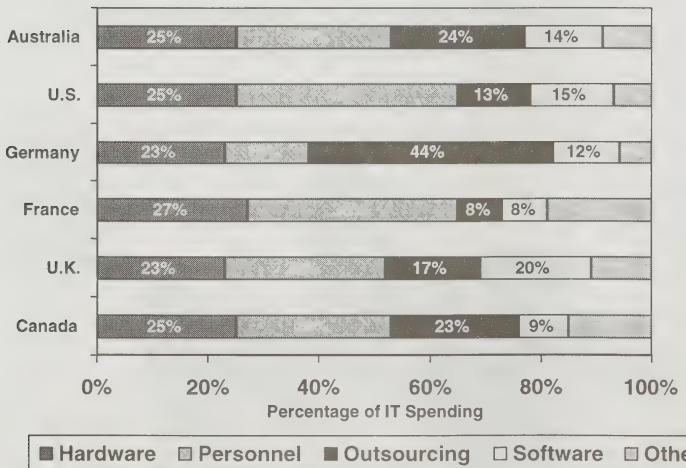
**Percentage Change of Spending Allocations
Between 1996 and 1999**



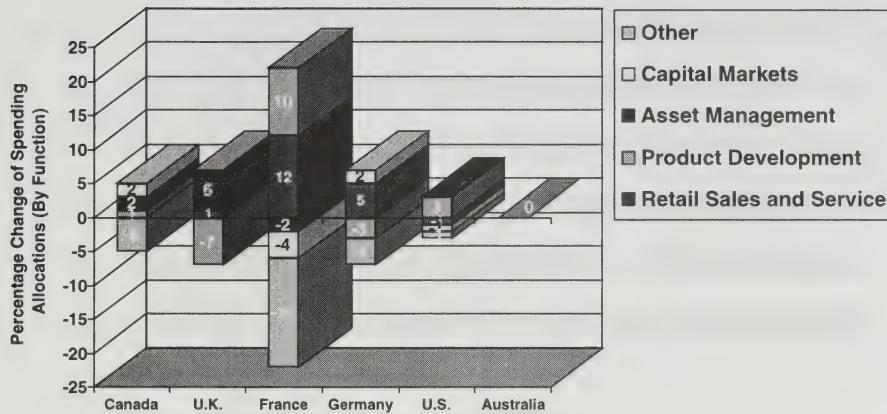
1996 Spending Allocations



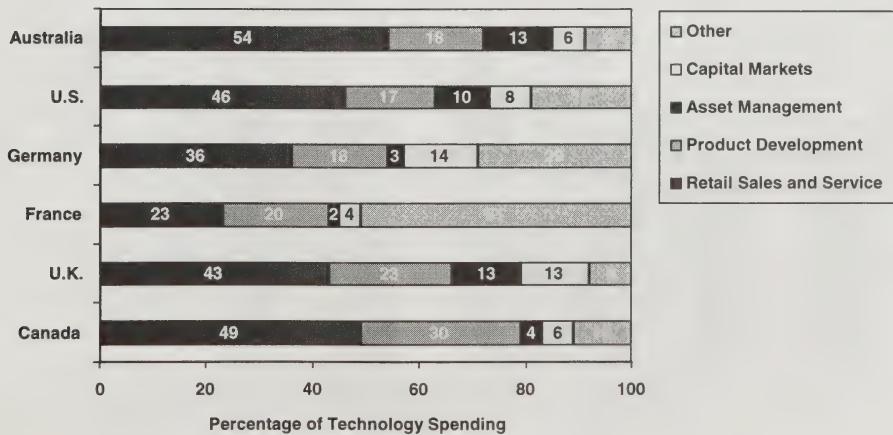
1999 Spending Allocations



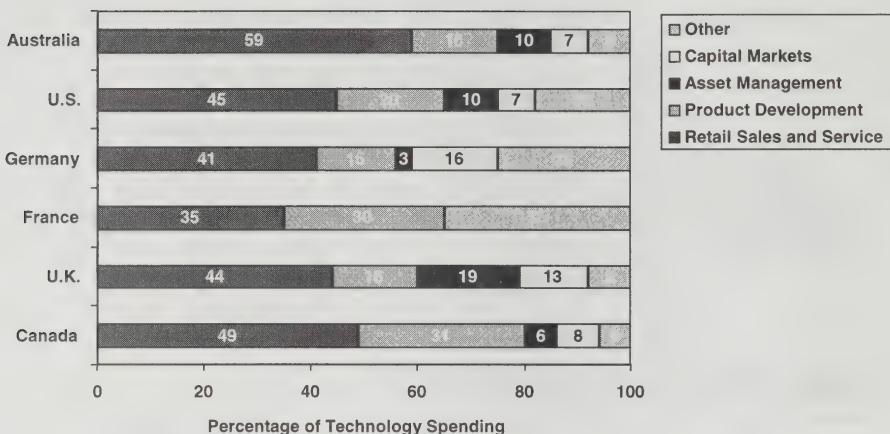
Percentage Change of Spending Allocation (By Function) Between 1996 and 1999



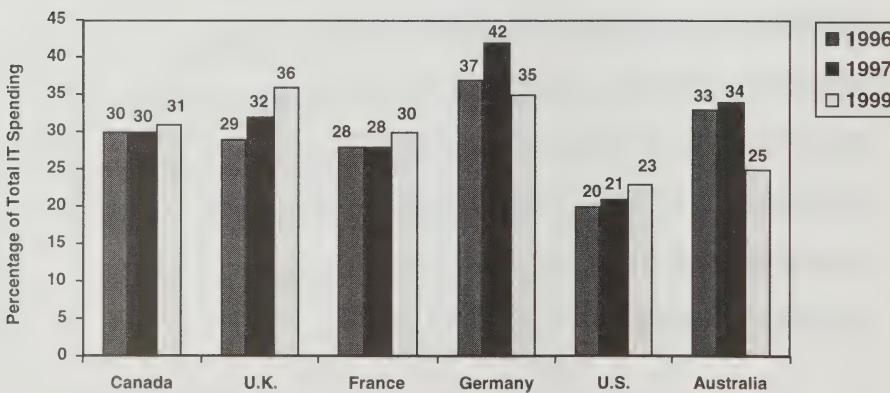
Allocation of Technology Spending By Function (1996)



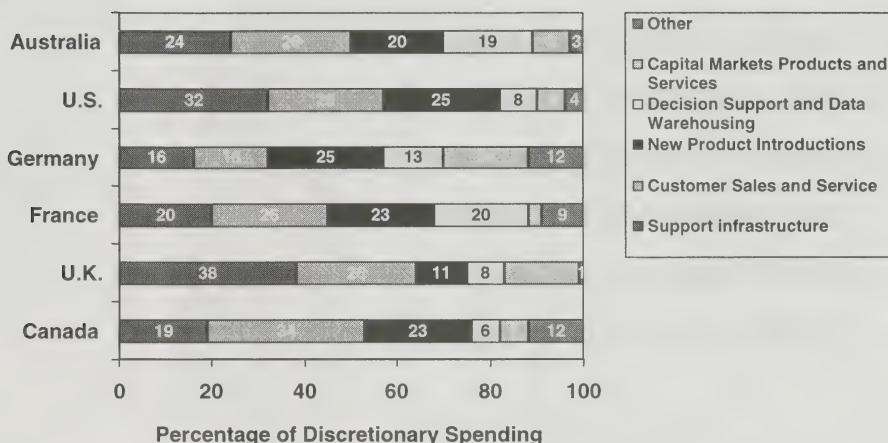
Allocation of Technology Spending By Function (1999)



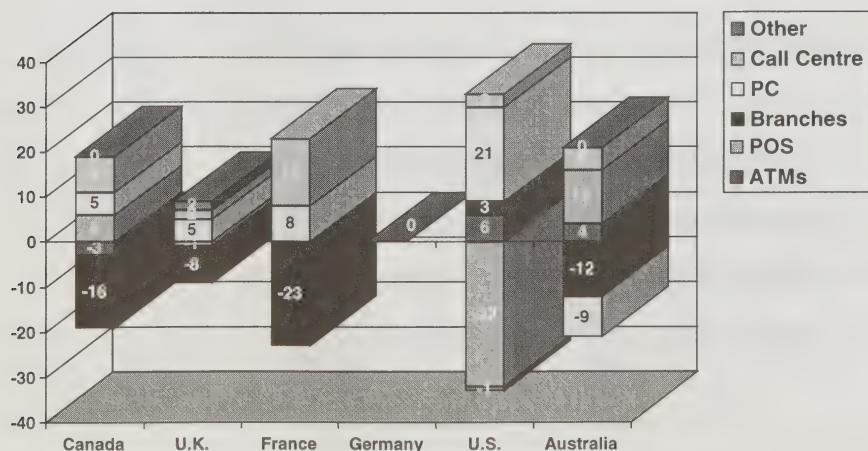
Discretionary IT Spending Trends



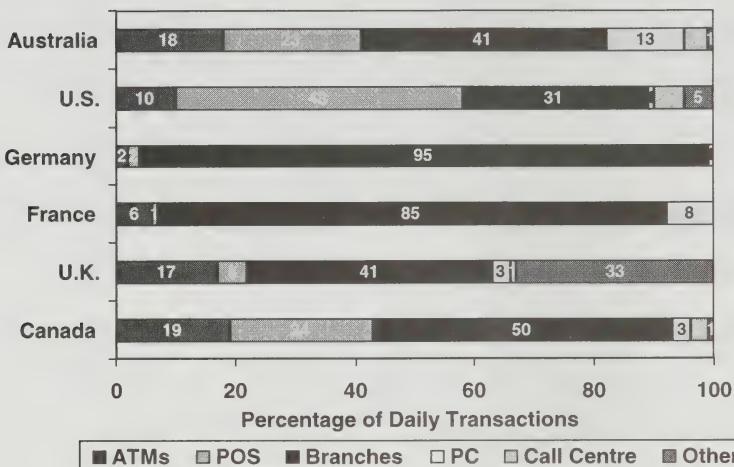
Distribution of Discretionary Spending (1996)



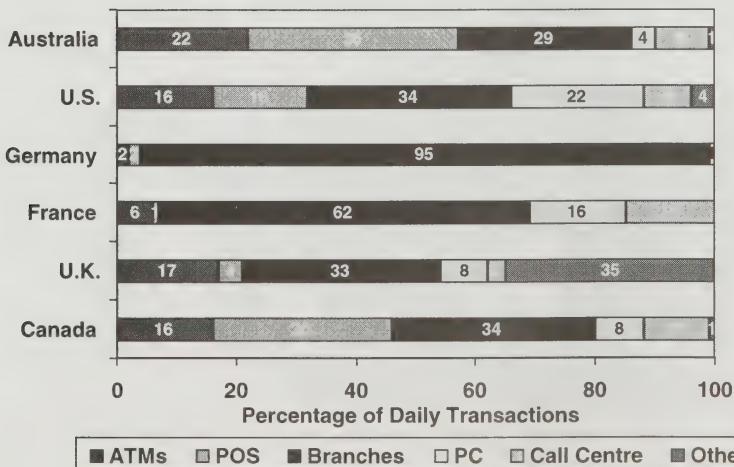
Percentage Change of Retail Transactions/Day Between 1996 to 1999



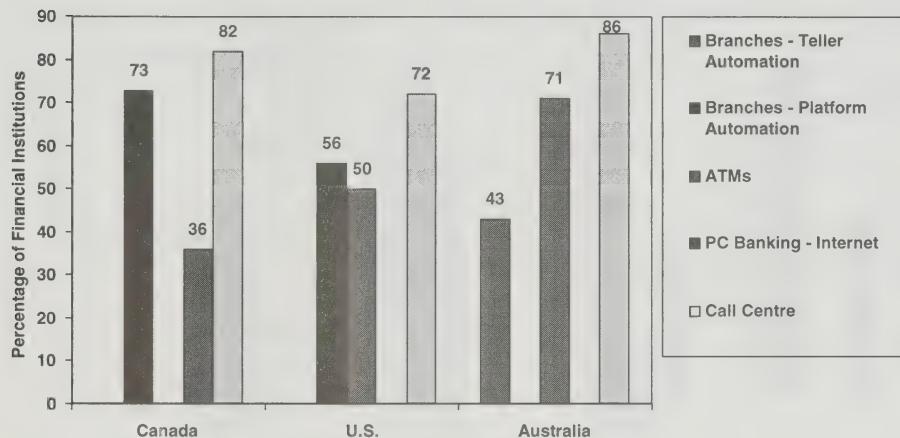
Distribution of Retail Transactions/Day (1996)



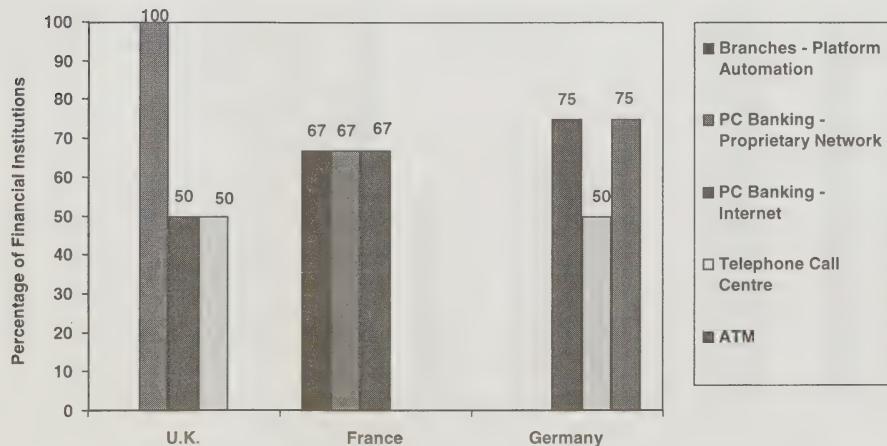
Distribution of Retail Transactions/Day (1999)



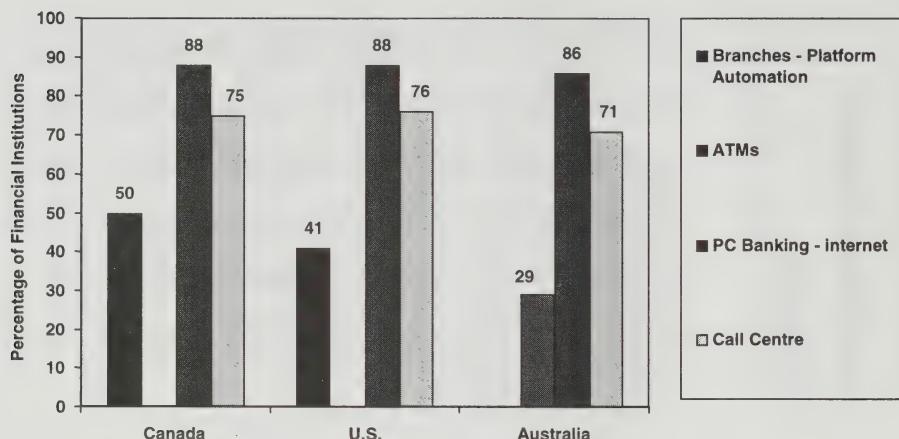
Most Important Technology Investments 3 Top Priorities (1996)



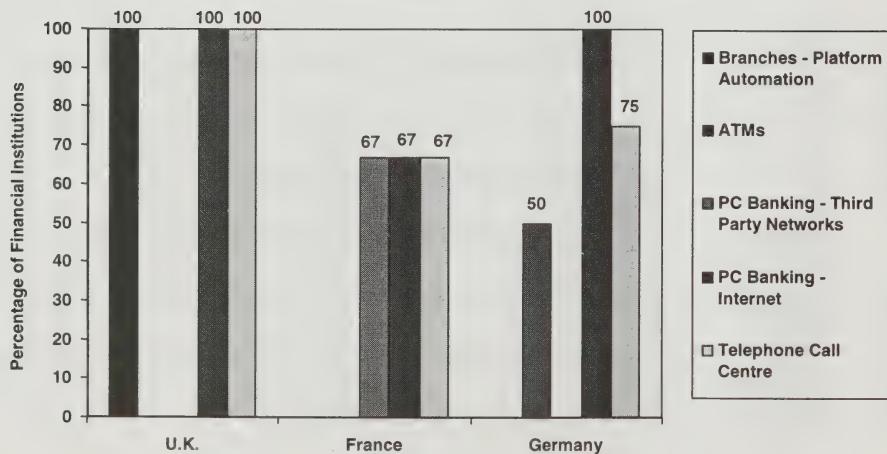
Most Important Technology Investments 3 Top Priorities Cont'd (1996)



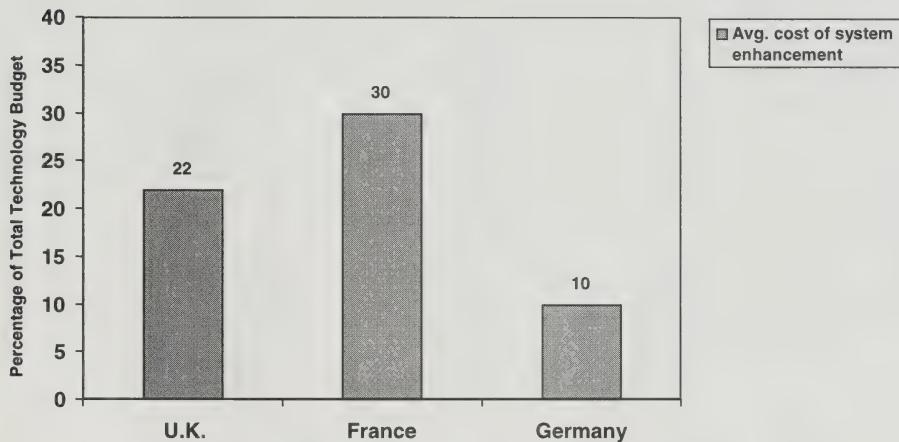
Most Important Technology Investments 3 Top Priorities (1999)



Most Important Technology Investments 3 Top Priorities Cont'd (1999)

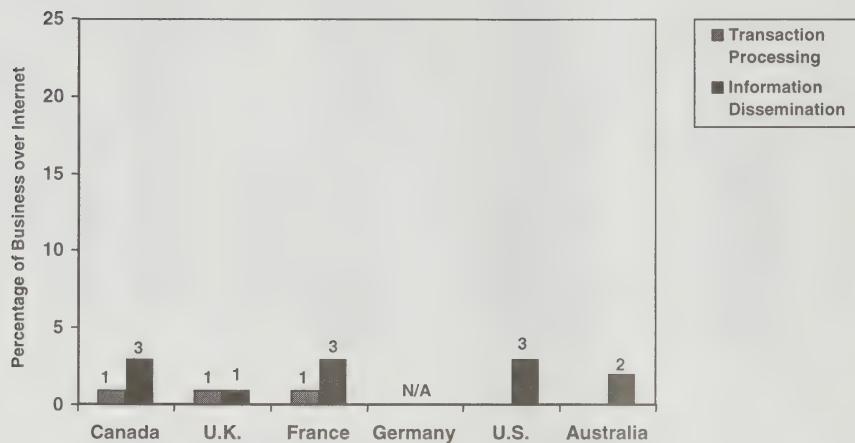


EMU Impact on Investment in Technology (European Institutions Only)

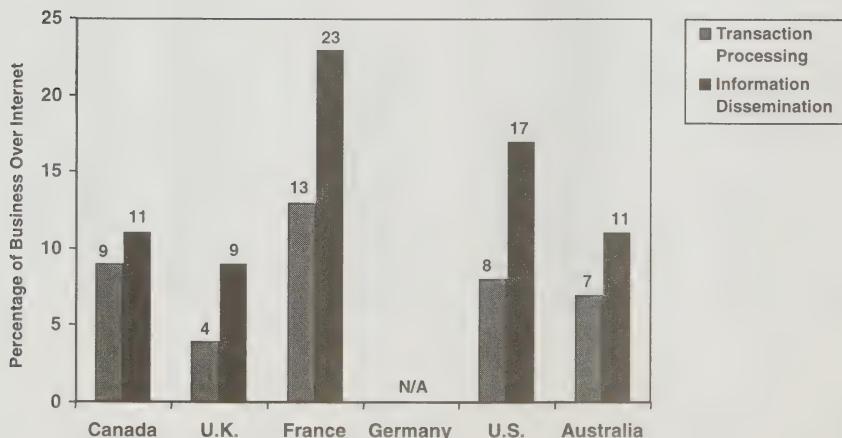


Internet Services

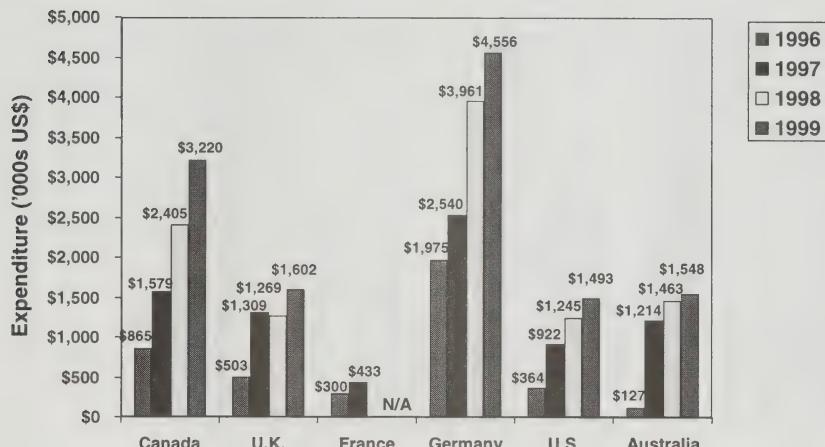
Percent of Business Over the Internet (1996)



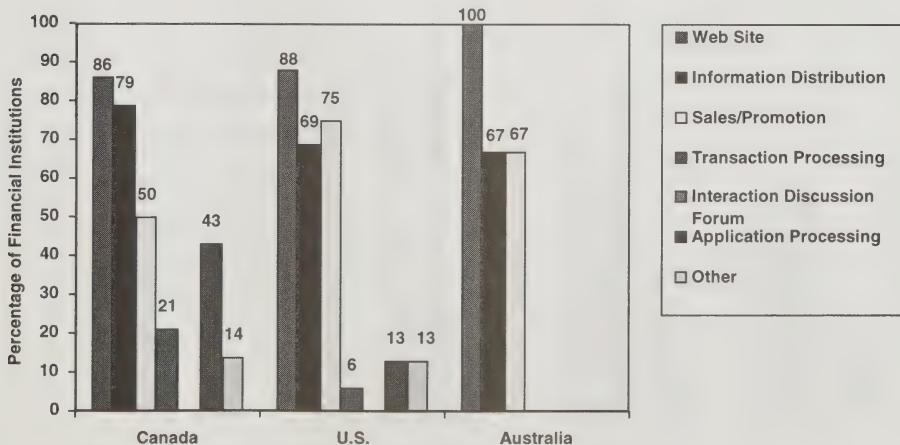
Percent of Business Projected for 1999 Over the Internet



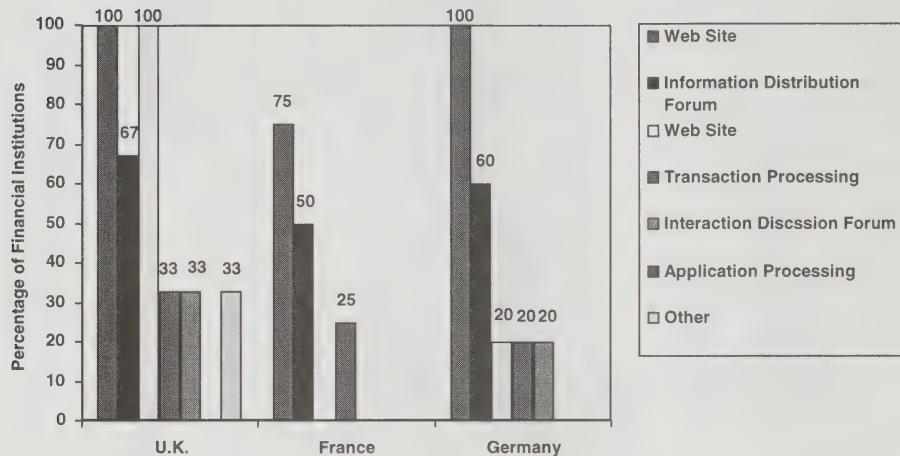
Expenditure To Develop & Maintain Internet Site (weighted average per institution)



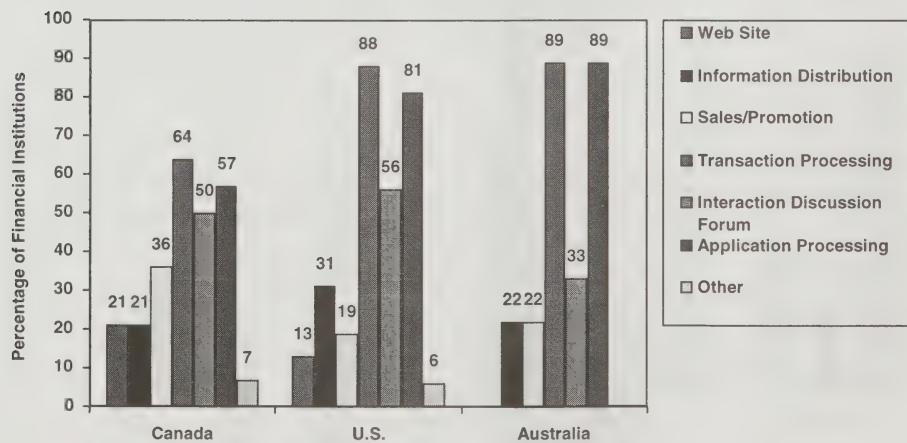
Internet Services In Use (1996)



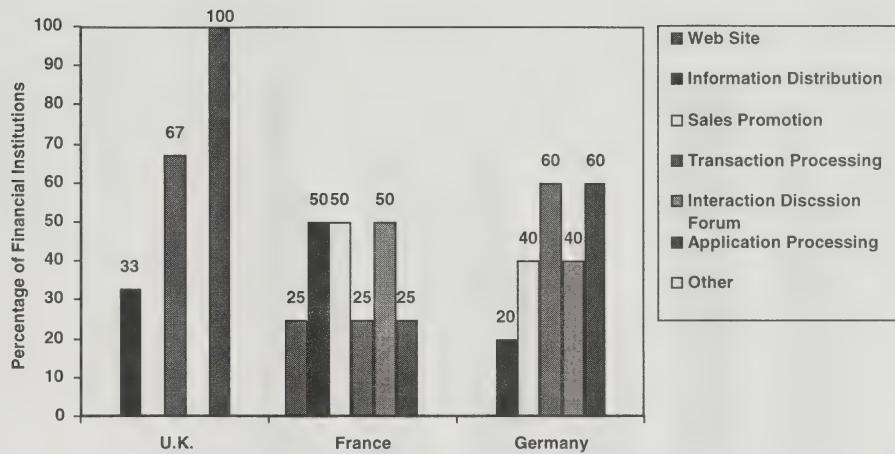
Internet Services In Use Cont'd (1996)



Internet Services Planning to Use

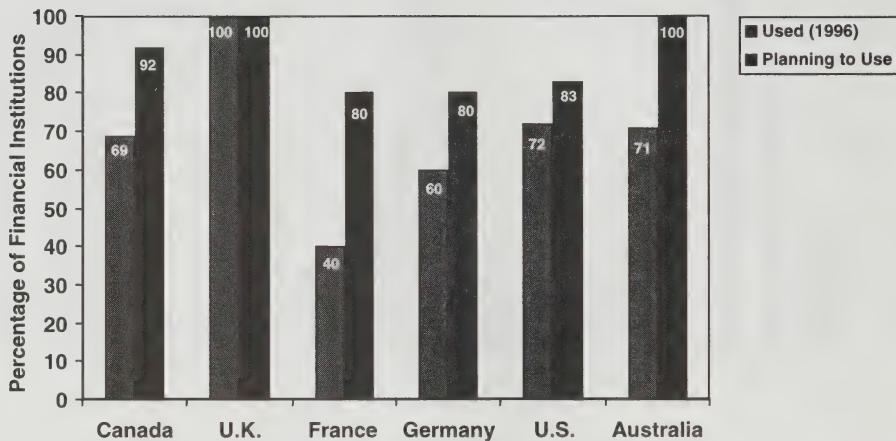


Internet Services Planning to Use (Cont'd)

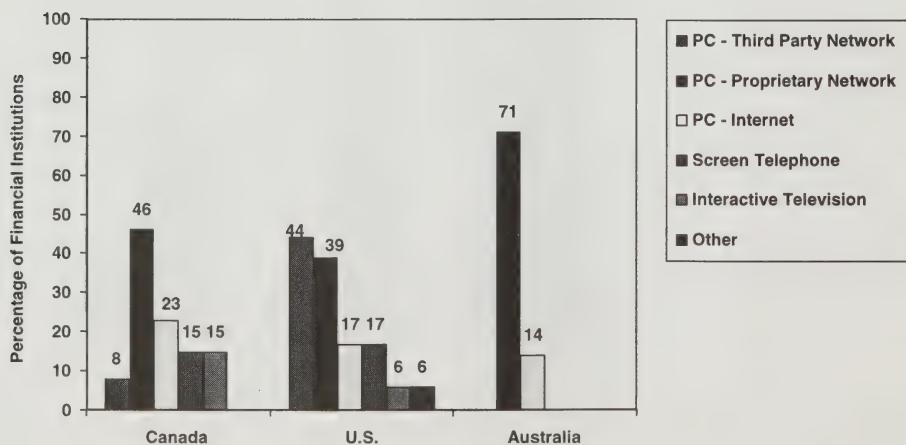


PC Banking

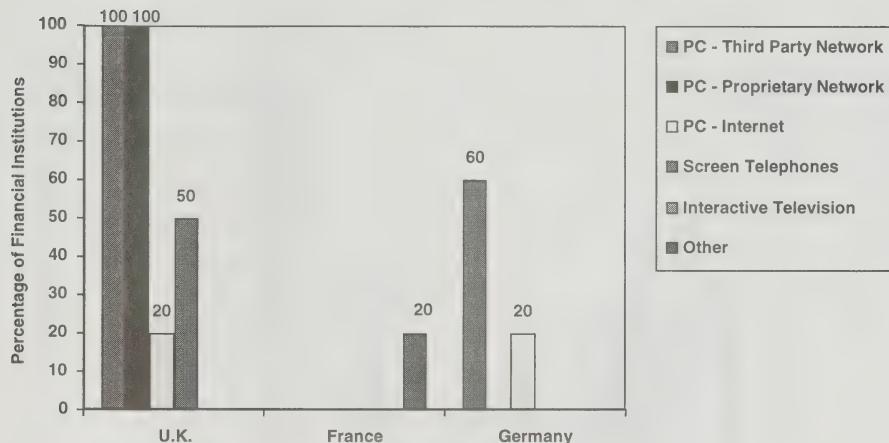
PC Banking Channels In Use or Planning to Use



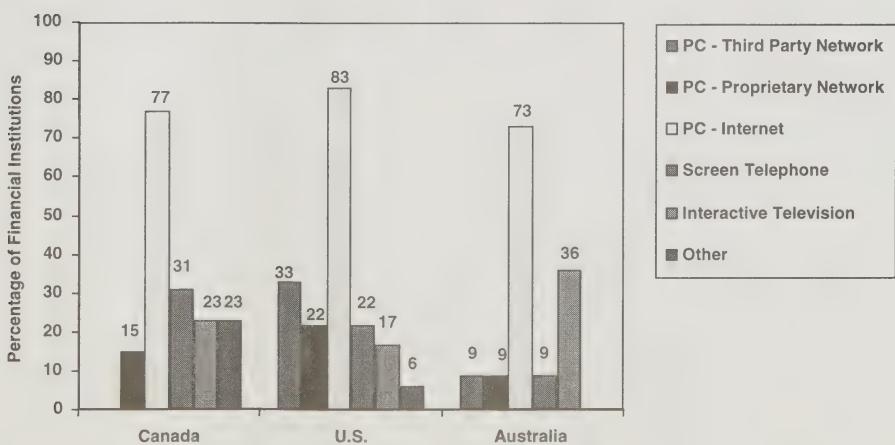
PC Banking Channels In Use (1996)



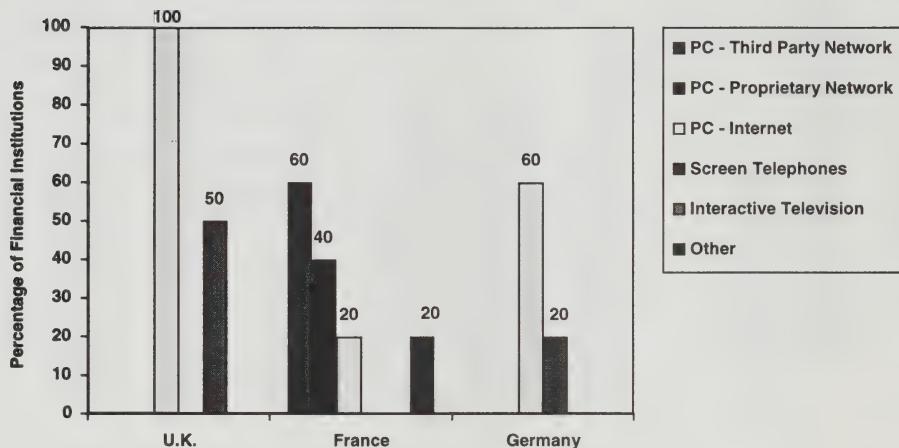
PC Banking Channels In Use Cont'd (1996)



PC Banking Channels Planning to Use

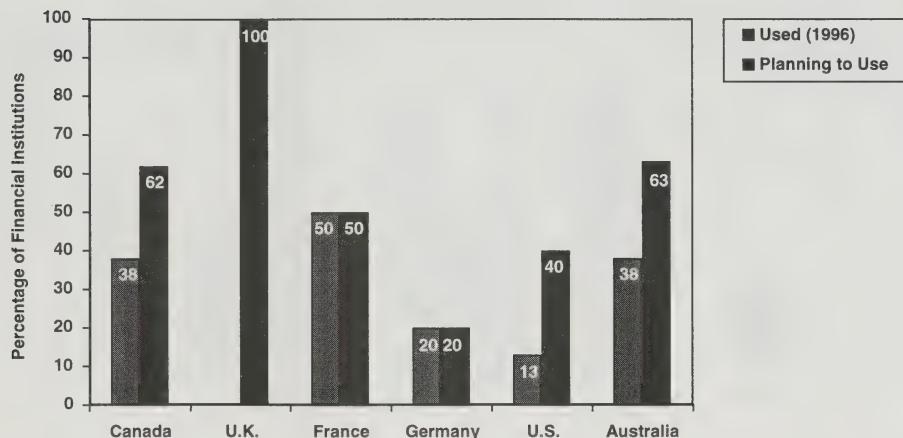


PC Banking Channels Planning to Use (Cont'd)



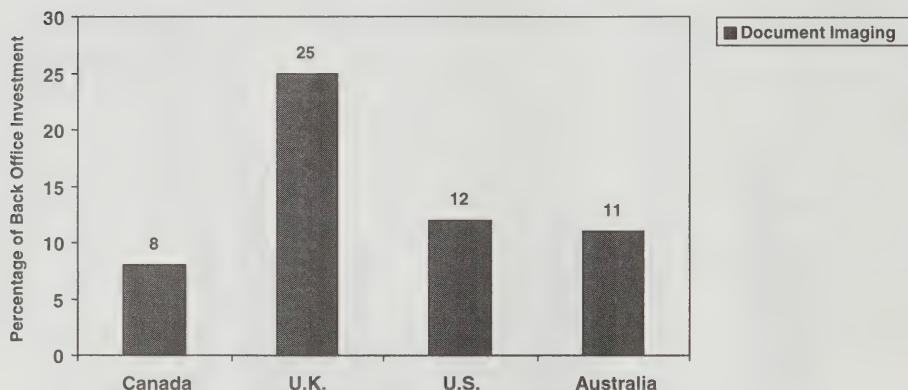
Smart Cards

Smart Cards Technology In Use or Planning to Use



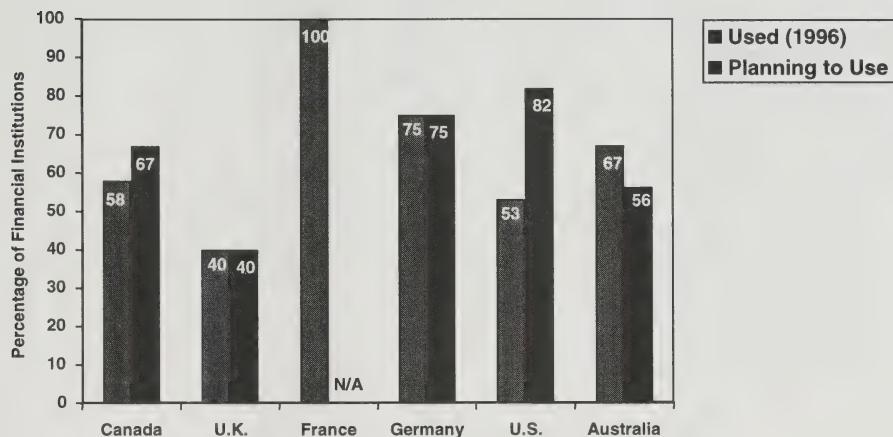
Document Imaging

Document Imaging Investment

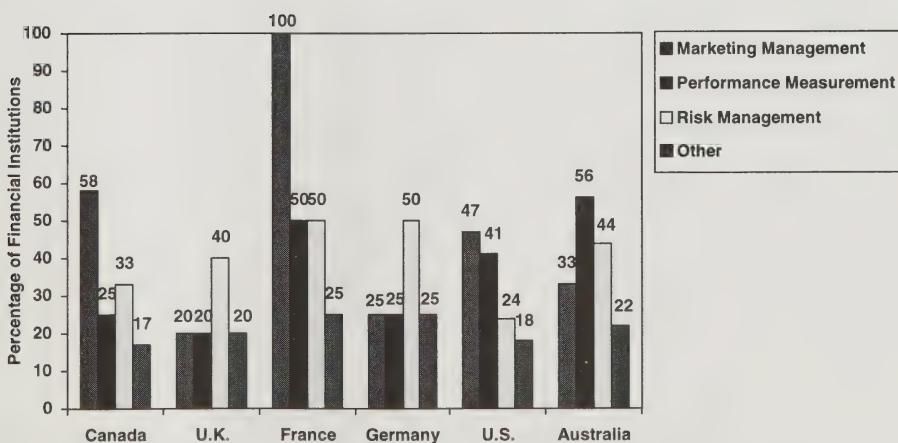


Data Warehousing

Use of Data Warehousing for Various Applications



Data Warehousing In Use for Various Applications (1996)



Appendix III:
Adoption of Information Technology

April 27, 1998

Adoption of Information Technology

The report on the Adoption of Information Technology, dated April 27, 1998 presents the results of interviews with Chief Information Officers from selected Canadian and U.S. based financial service organizations. The report provides an overview of trends in technology investment for the institutions surveyed and discusses the key strategic factors driving current and anticipated technology investment levels. The report also presents the factors that act as impediments to investment in technology from the perspective of the executives interviewed.

Contents

- Project Objectives and Scope
- Interview Guideline
- Interview Candidates
- Findings
- Conclusions

Project Objectives and Scope

- Objectives
 - To assist the Task Force in gaining a better understanding of the factors and issues affecting the adoption and use of technology in the financial services sector
- Scope
 - An interview based research initiative focused on major Canadian financial institutions and selected U.S. based financial institutions

Interview Guideline

Globalization and developments in technology have dramatically changed, and will continue to change, the environment in which the financial services industry operates. Within this context, the Task Force on the Future of the Canadian Financial Services Sector ("the Task Force") has been asked to make recommendations to enhance the ability of the sector to take full advantage of technological advances as they occur and to meet the competitive challenges resulting from the introduction of new technologies.

In order to respond to this aspect of its Terms of Reference, the Task Force seeks your response to the following questions related to technology adoption in your organization:

- Who in your organization is responsible for establishing the technology strategy and related investment program?
- What is the current level of investment in technology in terms of both capital and annual operating expenditures (\$'s, % of total income, % of non-interest expense)? What percent of this spending level would you define as primarily R&D?
- What is the expected annual rate of change in this level of investment over the next 3 to 5 years? What are the key strategic issues that are driving both the rate and nature of technology investment during this period?
- In your view, is this level of investment sufficient in the current environment to maintain or enhance your competitive position in your domestic market? Is it sufficient to compete effectively in the global market?
- What three areas of technology investment are most critical to your ability to compete over the next 3 to 5 years domestically? Are there other areas of technology investment that are critical to compete in the global market?
- What are the primary factors internal to your organization that influence your ability to invest in these areas to the extent you believe is necessary to remain competitive or to gain competitive advantage? What are the factors external to your organization that impact your ability to invest in these areas?
- What advantages, if any, do your current or emerging competitors have in terms of their ability to take full advantage of technological advances?
- Are there regulatory or legislative factors that impede your organization's ability to invest in new or innovative technologies that would enhance your ability to compete either domestically or globally?
- Are there other views or perspectives related to the adoption of technology in the financial services sector that you would like the Task Force to consider in the development of recommendations to enhance the ability of the sector to take full advantage of technological advances?

Interview Candidates

- Bank of America
- Bankers Trust
- Bank of Montreal
- Canadian Imperial Bank of Commerce
- Manulife Financial
- Royal Bank Financial Group
- Toronto Dominion Bank
- Sun Life of Canada

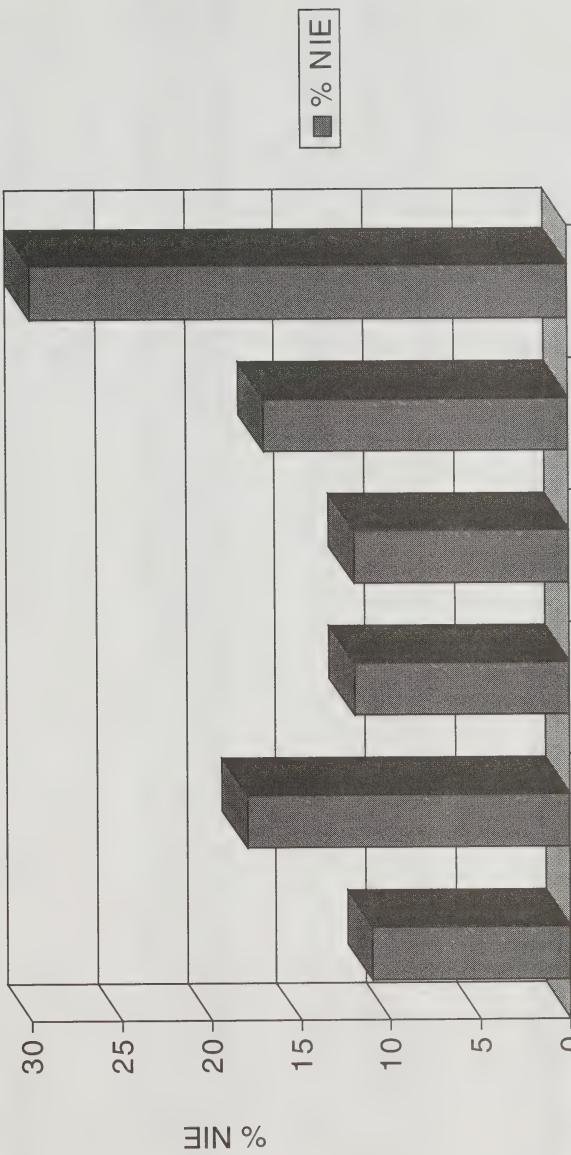
Findings

Responsibility for Technology Strategy and Investment Program

- The CIO or equivalent typically has primary responsibility for the overall technology strategy or infrastructure investment program at the enterprise level
- Technology investments at the business unit level are established through a variety of different models, each of which have the objective of ensuring alignment with business unit requirements. Options include:
 - Business units prepare business cases in conjunction with the IT department and the decision for the allocation of funds is made by a Management Committee or Investment Council
 - Technology Standards Board, representing each line of business, meet quarterly to evaluate investment programs on a line of business basis to ensure alignment between units. Central IT would have ‘one vote’ in this model
- Varying degrees of decentralization of IT capability and decision making are present in the population surveyed. In instances where the IT function is highly decentralized, the central IT organization retains full responsibility for technology strategy and architectural standards.

Technology Investments

- Technology spending for the organizations included in the survey ranged from \$350 MM to \$1.8 Bn for 1997.
- The level of technology spending as a percent of non interest expense ranged from about 11% to 17% for the institutions* surveyed. One organization reported technology spending at 30% of non-interest expense.



* Excludes insurance companies

Technology Investments (cont.)

- A number of factors affect the ratio of technology spending to Net Interest Expense. Research on this topic, conducted by the Tower Group, provided the following conclusions:

Profile of Financial Institution	IT % of NIE	Factors influencing NIE
Very large, money centre or capital markets oriented banks	15%-21%	Lower mix of branch retail business; cross-border businesses; more proprietary applications; high market share in fee-based processing businesses; selected investments in leading edge technologies
Large, retail regionals or superregionals	9%-17%	More retail branch business; little international; fewer processing businesses; more use of packages; very little leading edge technology
Smaller and community banks	4%-10%	Extensively outsourced, commodity products, primarily retail deposit business

Source: The Tower Group

Technology Investments

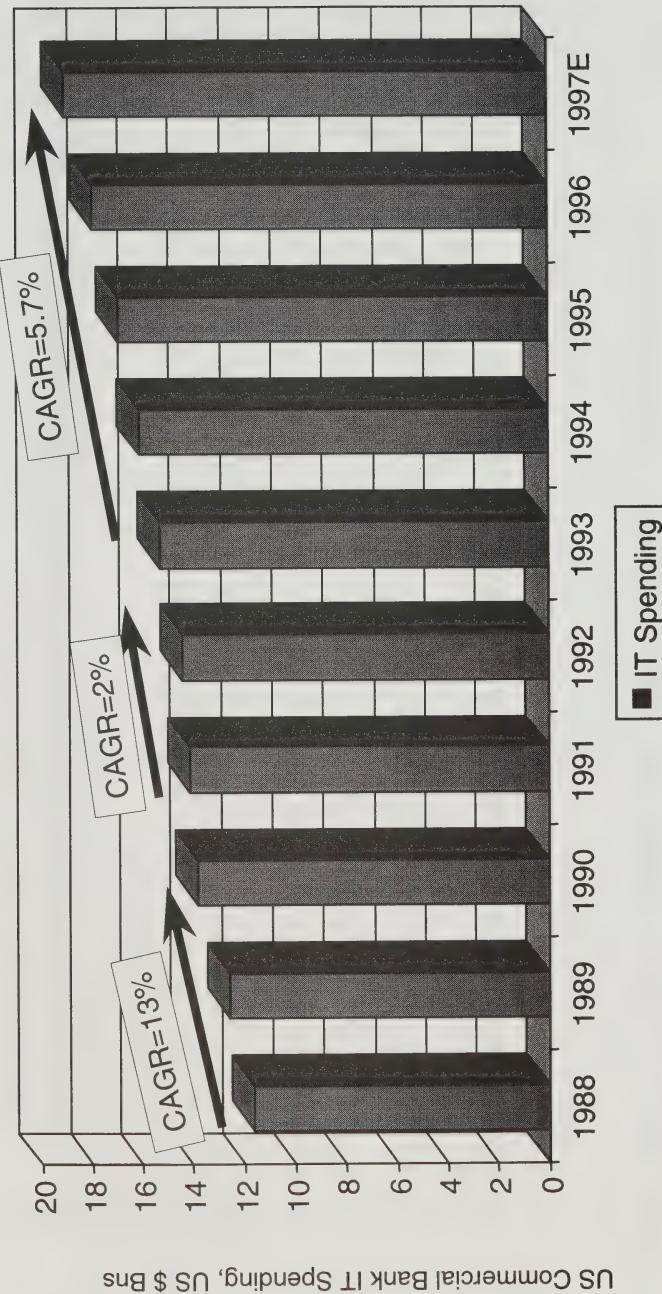
- Research and development is typically not budgeted as a distinct component of the technology budget; and research spending is related to specific products (e.g. new product development, ATM functionality). This spending is targeted at product and service enhancement initiatives rather than pure research and development.
- Two of the banks surveyed use related Venture Capital companies or Venture Funds to invest in high technology companies, and through these investments, gain access to research and development activities and stay current on technology developments.

Investment Trends and Drivers

- The expected annual rate of change in technology spending over the next 3 to 5 years ranges from ‘flat’ to 25%, with the majority in the 5% to 7% range.
- Any significant differences in planned spending reflect the relative state of the technology infrastructure of the financial institutions surveyed, and their focus on specific lines of business. In addition, some of the institutions surveyed have invested at relatively high levels in the past five years and will now focus on shifting investments to ‘value creating’ initiatives from ‘value sustaining’ activities.
- At the other extreme, one survey respondent indicating significant increases in planned spending, is working to put in place an effective technology infrastructure over the next 3 years, having significantly under-invested in the past.

Investment Trends and Drivers (cont.)

- The 5% to 7% range observed is consistent with the overall compound rate of growth in IT spending for US commercial banks.



Investment Trends and Drivers (cont.)

- The key strategic issues driving the rate and nature of investment in technology over the next 3 to 5 years include:
 - proliferation of delivery channels and the need to deliver all products through every channel offering a consistent level of service
 - need for integration of customer information to provide a single view of the customer at each point of contact in the delivery system
 - shift to Electronic Commerce from traditional forms of commerce
 - investments required to become Year 2000 compliant
 - investments needed to meet Euro currency requirements
 - requirement to move to open systems architectures from traditional reinvestment in the technology infrastructure

Sufficiency of Current Investment Levels

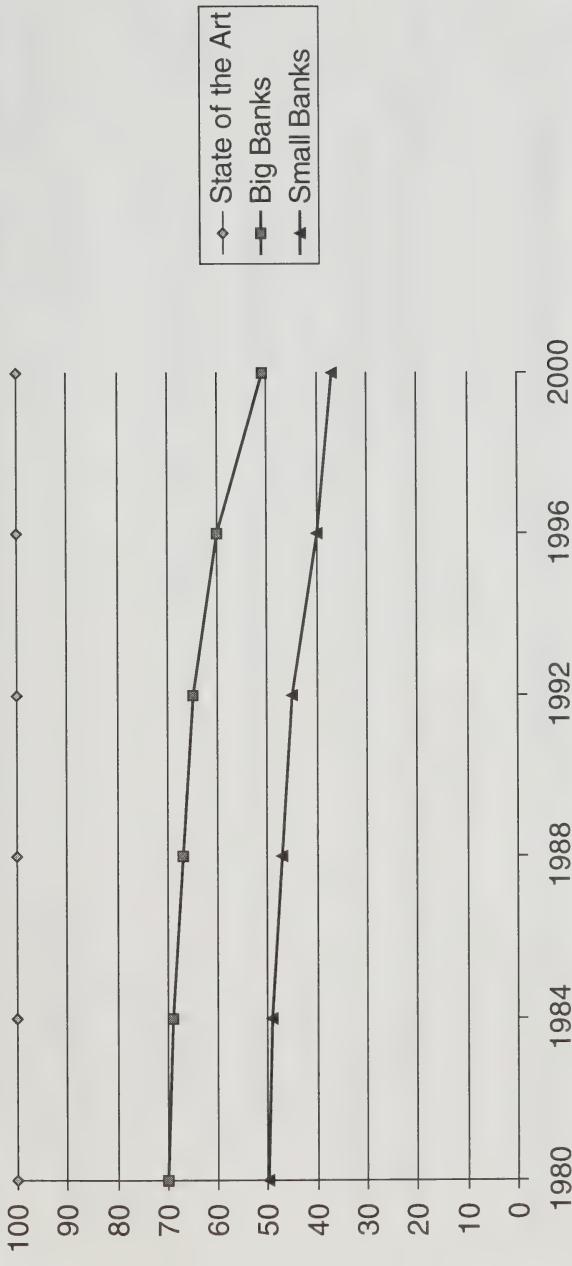
- Survey respondents share a general view that planned investment levels will not be sufficient due to:
 - > rate of change in the industry
 - > technological obsolescence
 - > increasing expectations for consistently high quality service at each customer point of contact.
- A significant challenge is anticipated in competing against non-traditional competitors who are highly technology enabled and don't have the legacy infrastructure that continues to demand significant levels of investment to sustain. As a result, current investment levels are generally viewed as insufficient to remain competitive in the future.
- Non-value creating investments continue to take funding away from value creating investment opportunities. The Year 2000 dilemma and Euro currency requirements exacerbate this problem.
- Globally, the complexity of multiple platforms and scale of major global players (e.g. State Street, First Data Corp, Microsoft) make current investment levels inadequate to compete effectively.

Sufficiency of Technology Investments

- Research conducted by the Tower Group indicates that the banking industry overall is falling further behind relative to ‘state of the art’ technology, with ‘state of the art’ being defined as the infrastructure that would be in place if a bank built a new ‘green field’ technology infrastructure today.
- With ‘state of the art’ receiving a score of 100 points, their research indicates that the average big bank in the US would have had a score of about 60 in 1980 and 48 today with a continuing downward trend. Smaller banks would score about 20 points below the larger banks. This is indicative of the Canadian situation.
- This trend is a key factor in driving the outsourcing activities of the past five years. Specialist service providers (e.g. credit card processing, mortgage processing) invest heavily in technology enabled processes to provide high service levels at lower cost relative to many in-house operations. Technology spending on external service providers is expected to continue to rise.

Sufficiency of Technology Investments (cont.)

- Research of U.S. banks' technology investments indicates a trend away from the state of the art. This reflects increased disaggregation of IT capabilities and the trend to virtual banking.



Source: The Tower Group

Critical Areas of Technology Investment

- The following areas of technology investment are viewed as critical to compete effectively over the next 3 to 5 years:
 - Electronic Commerce and Internet Technologies
 - Customer Information Management / Data Integration and Mining
 - Collaborative Computing / Workflow Technologies
 - Infrastructure Enhancement to better meet needs of a distributed environment
- There is no significant difference in the areas of technology investment required to compete domestically and internationally. As globalization continues, differentiating between domestic and global requirements becomes less relevant.

Internal Impediments to Technology Investments

- The primary internal impediments to investing in information technology include:
 - availability and allocation of funds given investments required for Year 2000, Euro currency requirements, demutualization and infrastructure maintenance
 - business leadership and commitment for revenue to drive the business case for technology investment
 - near term focus on obtaining returns on technology investments, given the impact on non interest expense and shareholder value targets (e.g. Electronic Commerce)
 - scale of operations not sufficiently large to redirect necessary funds to value creation activities
 - effectiveness of the business / technology partnership and availability of high quality resources

External Impediments to Technology Investment

- The major external impediments to investing in information technology are:
 - > availability of experienced human resources. Domestically, our education system is not viewed as focused sufficiently on information technology. In addition, strong performers are attracted to major technology companies (e.g. Microsoft, Sun Microsystems). Further demand is expected from Europe over the next few years pace of technological change and the lack of true 'open architectures' to facilitate multiple vendor solutions
 - > current ambiguity around standards for data interchange and E-Commerce, causing delays in decision making and related technology investments
 - > limited ability to gain advantage from technologies that support 'one stop' shopping, given regulatory restrictions
- There is a view that the nature and extent of regulation in Canada has had the effect of suppressing market capitalization relative to US and other global competitors. In particular, restrictions on ownership are viewed as a factor which has reduced market capitalization, affecting funding levels available for technology investments.

Competitor Advantages

- Financial institutions who are the focus of this research identified a number of advantages that emerging competitors have in the area of technology adoption:
 - emerging competitors do not have the legacy systems, infrastructures or Year 2000 issues, with the result that funds are more readily available for value creation activities
 - monoline providers and technology companies have the scale to invest in state of the art technologies specific to their area of specialty (e.g. credit card processing), thereby maintaining cost and effectiveness advantages not easily matched elsewhere
 - deregulation of telecommunications enables new entrants to invest in related technologies at the bottom of the price curve, providing low cost of entry opportunities
 - new competitors, such as Microsoft and First Data Corporation, operate under a different regulatory regime but are expected to continue to compete in a number of components of the value chain for delivery of financial services to consumers and businesses.

Regulatory Impediments

- Most of the financial institutions represented do not consider regulatory issues as a major factor in the adoption of technology when viewed relative to other internal factors and resource constraints. However, a number of specific items were noted which are viewed by certain institutions surveyed as impediments to the adoption of technology. These include:
 - regulations that restrict scale of operations have the effect of limiting funds available for technology
 - restrictions on sharing of customer information between business areas (e.g. deposits and insurance) impact investment levels in customer information management and data mining applications

Other Views for the Task Force

- The following represent other views and perspectives of the financial institutions interviewed. These views are not necessarily attributable to any specific institution, nor are these views necessarily shared by all participants to this study.
- > Quality and availability of human resources will be a major constraint to Canadian financial institutions, both in the areas of technology and other business operations. This will be a major issue for the next decade.
- > Approximately 70% of web sites on the Internet have their origin in the U.S. To help ensure Canada has an important role in E-Commerce in the future, it is important that financial institutions remain an integral part of the payments system.

Other Views for the Task Force (cont.)

- Scarcity of knowledge workers in Canada and the unfavourable personal tax structure compared to other jurisdictions will continue to erode our country's intellectual capital and therefore, our ability to compete in the medium to longer term.
- Standards with respect to security need to be established to build confidence of the public for E-Commerce. Canada is doing well in aligning its initiatives with the OECD. This needs to continue.
- E-Commerce is not necessarily a threat to privacy. The focus should be on the benefits that flow to business, government and consumers through E-Commerce. Alignment with U.S. and Europe is essential.
- Actions are needed to encourage innovation. One respondent challenged the Task Force to name three financial services products that were recently 'invented in Canada'.

Conclusions

- Regulatory factors have not been significant impediments to the adoption of technology by financial institutions in Canada.
- The primary impediments to the adoption of new technology are scarcity of experienced resources and leadership on the part of both business and technology to define and implement innovative business solutions that are technology enabled.
- Scale is seen by a number of institutions as a critical factor in their ability to invest in the technologies required to compete in the future, citing monoline service providers and major global financial institutions as evidence of this requirement.
- Others believe that focusing on specific market niches (e.g. Investment Banking) is more important than scale in succeeding in the financial services sector.
- The requirement for scale should be addressed in the context of the strategy of different financial institutions. The requirements for those pursuing a ‘universal bank’ model differ from those of niche players.

Appendix IV:
Rate of Adoption of Technologies and
Regulatory Implications for Financial
Institutions

November 14, 1997

Agenda

- Project Scope and Objectives
- Methodology and Approach
- Top Line Findings
- Overall Conclusions
- Implications for Regulation

Project Scope and Objectives

Project Objectives

- Assess whether Canada is keeping pace with other benchmark countries in adopting new technologies
- Assess whether there are any regulatory or other impediments to the adoption of new technologies by Canadian Financial Institutions

Project Scope

- Overview of technology adoption trends in Financial Institutions
- Focus on 5 emerging, leading-edge technologies
 - ⇒ Internet Services, PC Banking, Smart Cards, Data Warehouse, Imaging
- Comparative analysis of 5 benchmark countries
 - ⇒ United States, Germany, France, UK, Australia
- Regulatory implications to the adoption of new technologies

Methodology and Approach

Methodology and Approach

- Information Sources -

- Database utilized from Ernst & Young 1997 Special Report on Technology in Banking and Financial Services
- Survey data supplemented by interviews with CIOs of selected Financial Institutions and Ernst & Young partners in US, Germany, France, Australia and the UK
- Literature search on technology trends, emerging technology issues and related regulatory responses

Methodology and Approach

- Interpreting the Data -

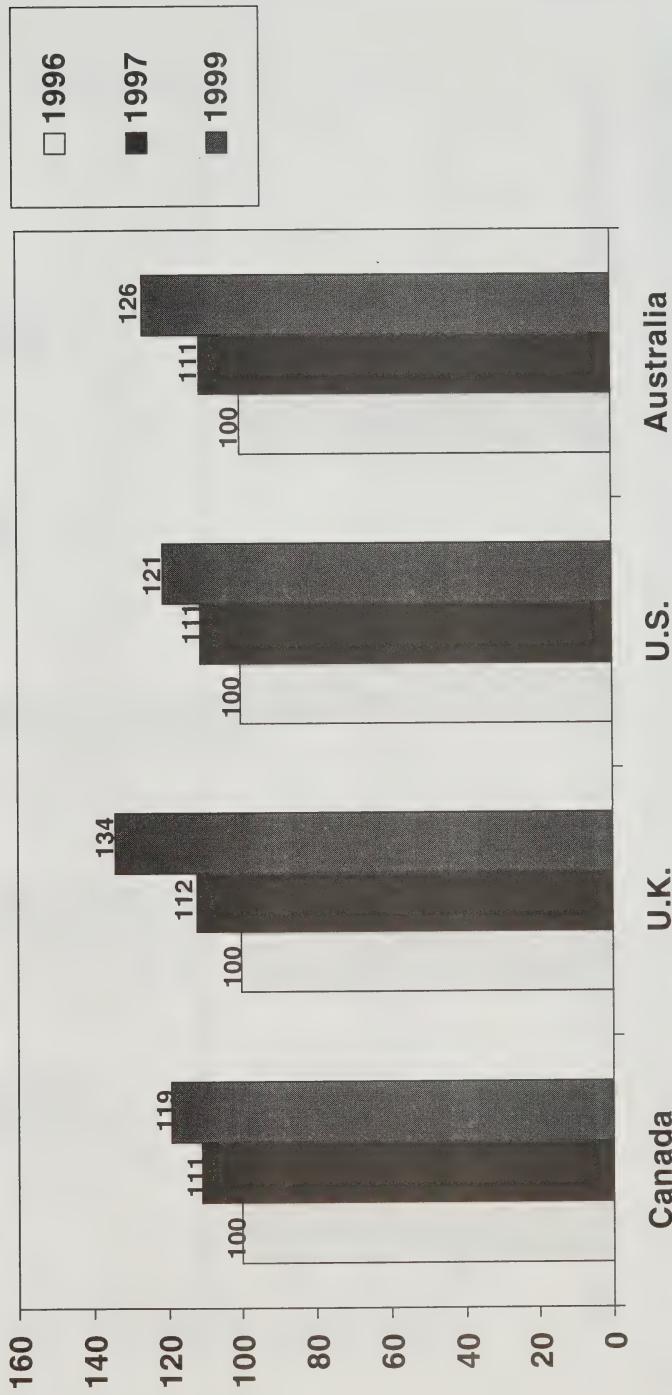
- Response rate and sample size varies by country
- Survey results are indicative of general trends in technology spending
- Database does not represent a statistically valid sample

Top Line Findings

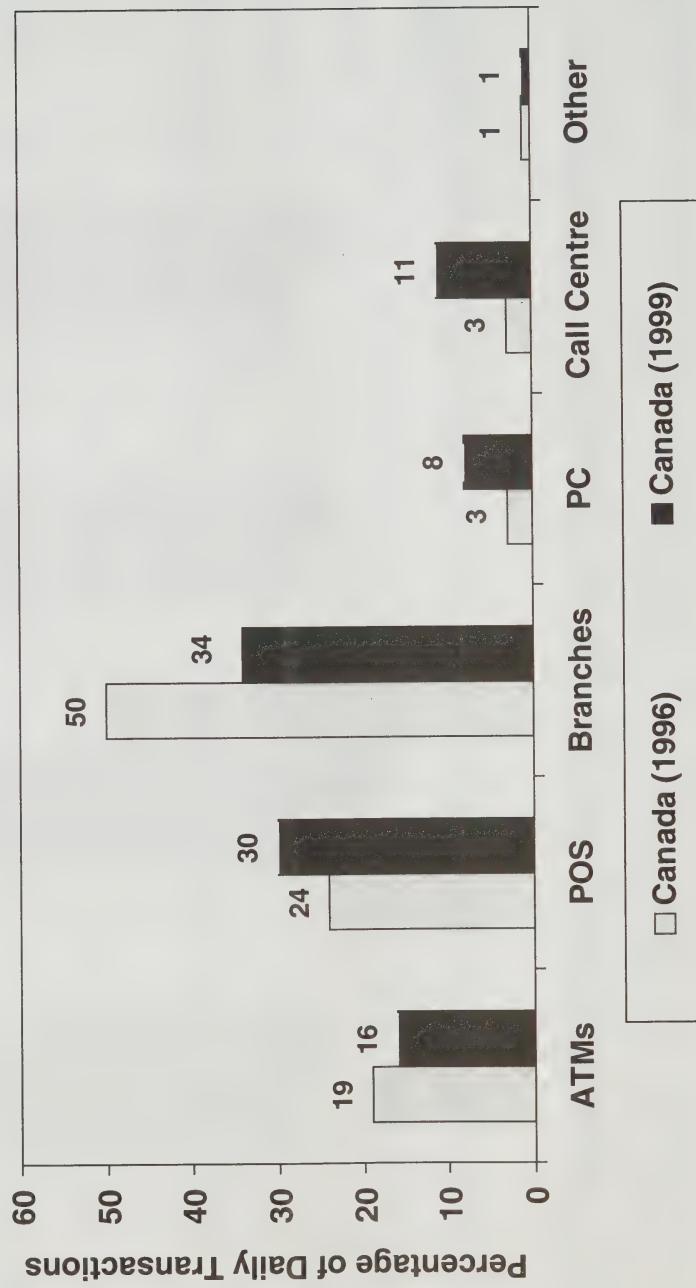
General Trends in Technology Spending

- Technology budgets will continue to rise between 1996 and 1999 in all countries
- Rate of spending growth is relatively consistent between all countries
- Allocation of technology spending between hardware, software and people is also relatively consistent globally
- Some differences exist in the proportion of spending allocated to outsourced services

Canada's growth in technology spending is consistent with Benchmark Countries



The redistribution of transactions from the branches to alternative channels will continue in Canada

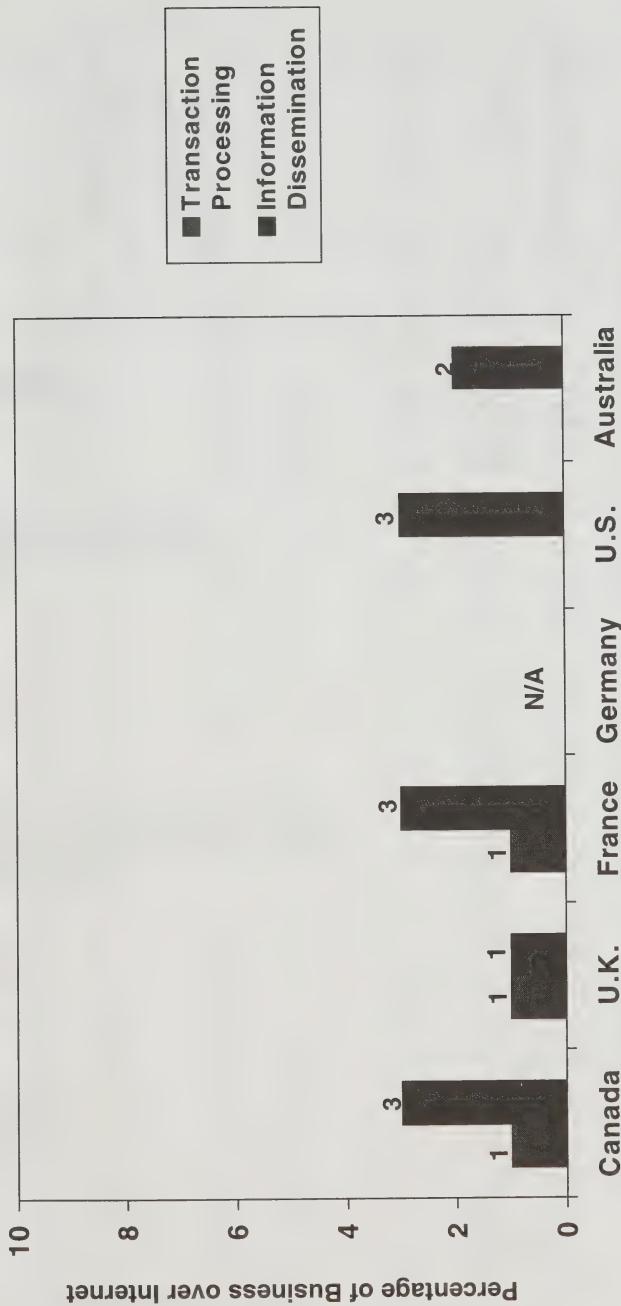


Top Line Findings

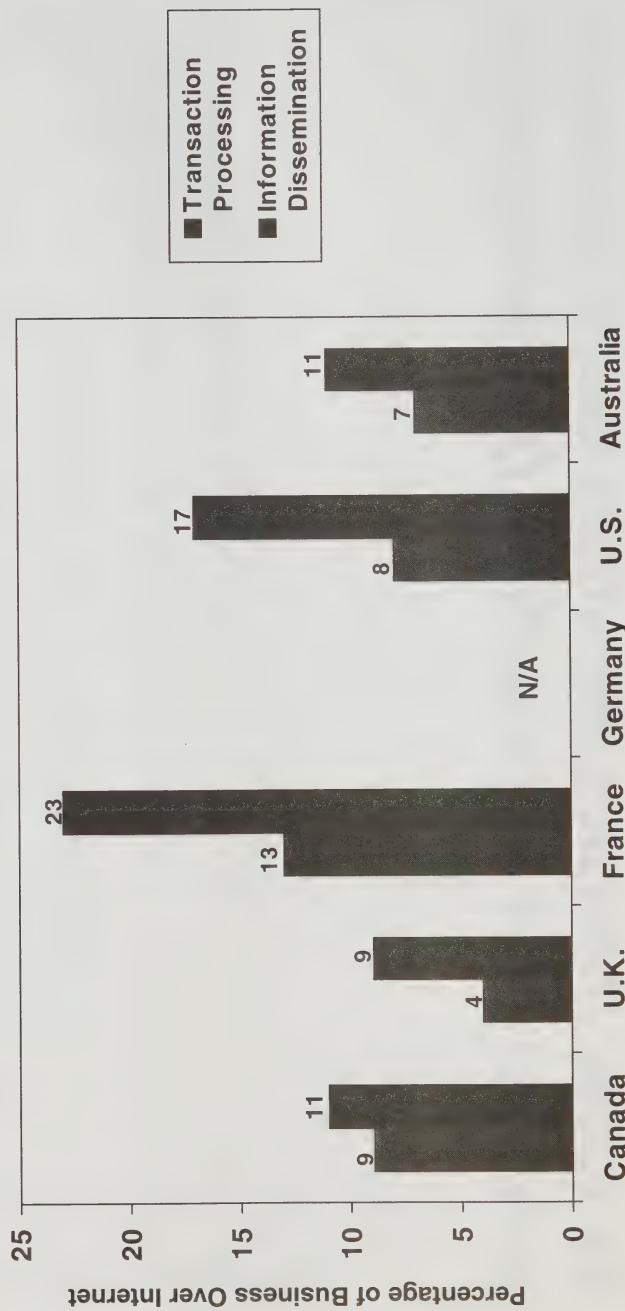
Benchmark Technologies

Internet Services

In 1996, Internet Services were focused primarily on Information Dissemination



Benchmark countries expect transaction processing will represent about 10% of business by 1999, an increase of about 400% over 1996



Internet Services

- Canadian Financial Institutions expect business on the Internet to grow at a rate consistent with other countries
- Internet banking was cited as the most important technology investment for 1999 globally
- French banks are expecting significantly greater growth than other countries, which could reflect 'Minitel' infrastructure

Internet Services

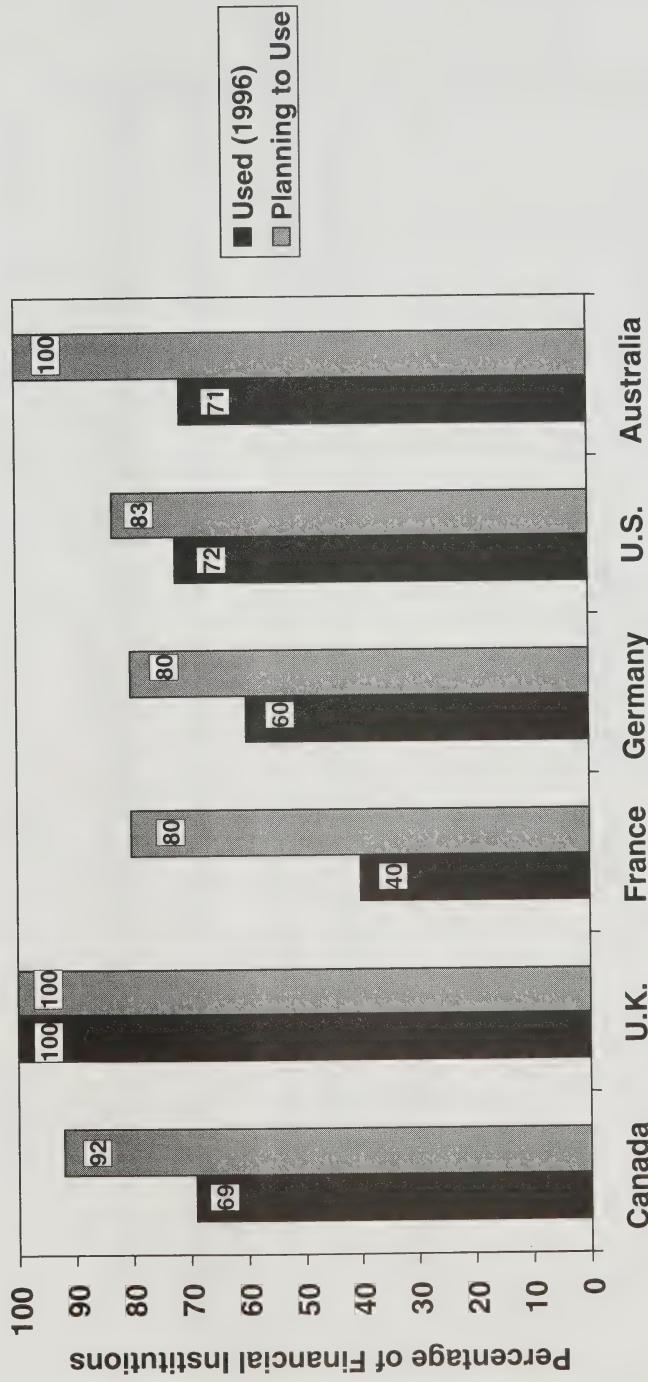
- Hypothesis:
 - ⇒ Internet technologies are in early stages of evolution
 - ⇒ Financial Institutions are currently integrating Internet technologies into overall information and knowledge management strategies
 - ⇒ Impediments to adoption of Internet technologies include:
 - Availability of proven technologies
 - Gaps in legislation for electronic commerce
 - Security, transmission standards, customer behaviour and related privacy issues
 - Velocity of change in technological developments

PC Banking

PC Banking

- PC Banking Channels include:
 - ⇒ PC - Third Party Networks
 - ⇒ PC - Proprietary Networks
 - ⇒ PC - Internet
 - ⇒ Screen Phones
 - ⇒ Interactive Television

Usage of PC Banking Channels will continue to increase in Canada and all benchmark countries



PC Banking

- Hypotheses:

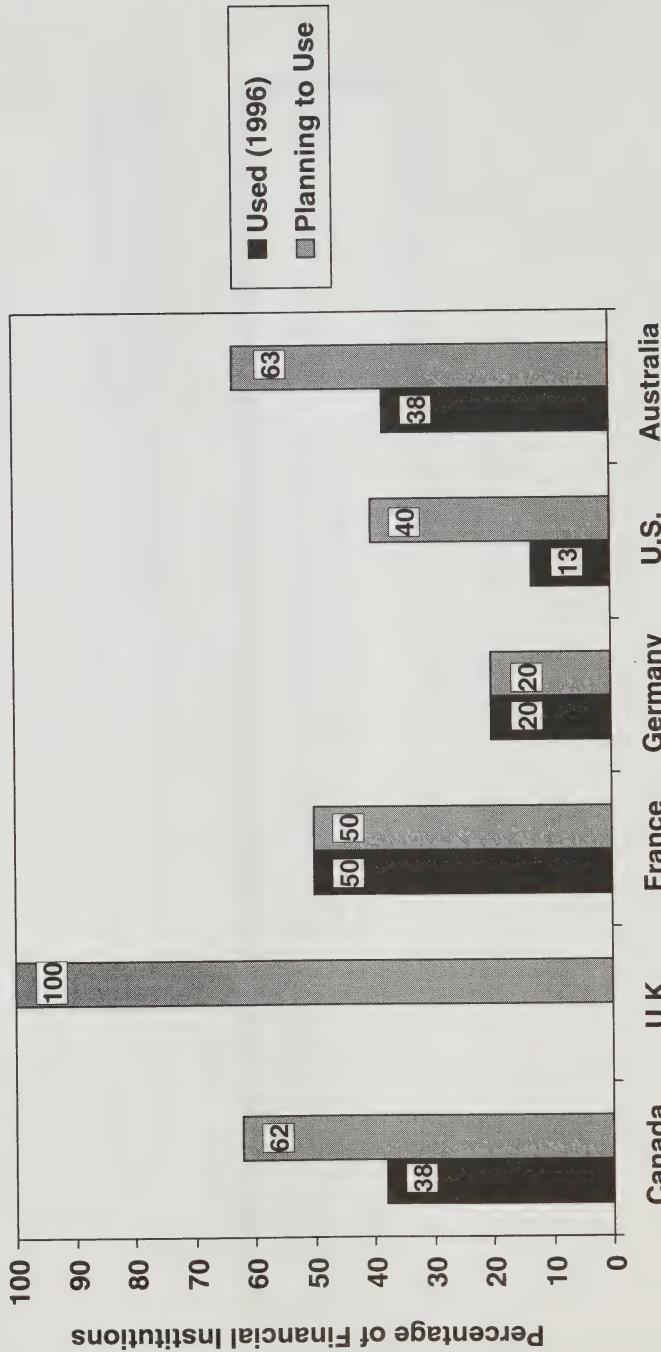
⇒ Canadian regulatory environment has not impeded adoption of PC Banking technologies to date, based on CIO interviews and survey data

⇒ Primary factors affecting adoption of PC Banking technologies include:

- Existing country infrastructure and penetration of PC's in homes
- Consumer attitudes toward to the use of technology

Smart Cards

Canada is emerging as one of the leaders in adoption of Smart Card technology



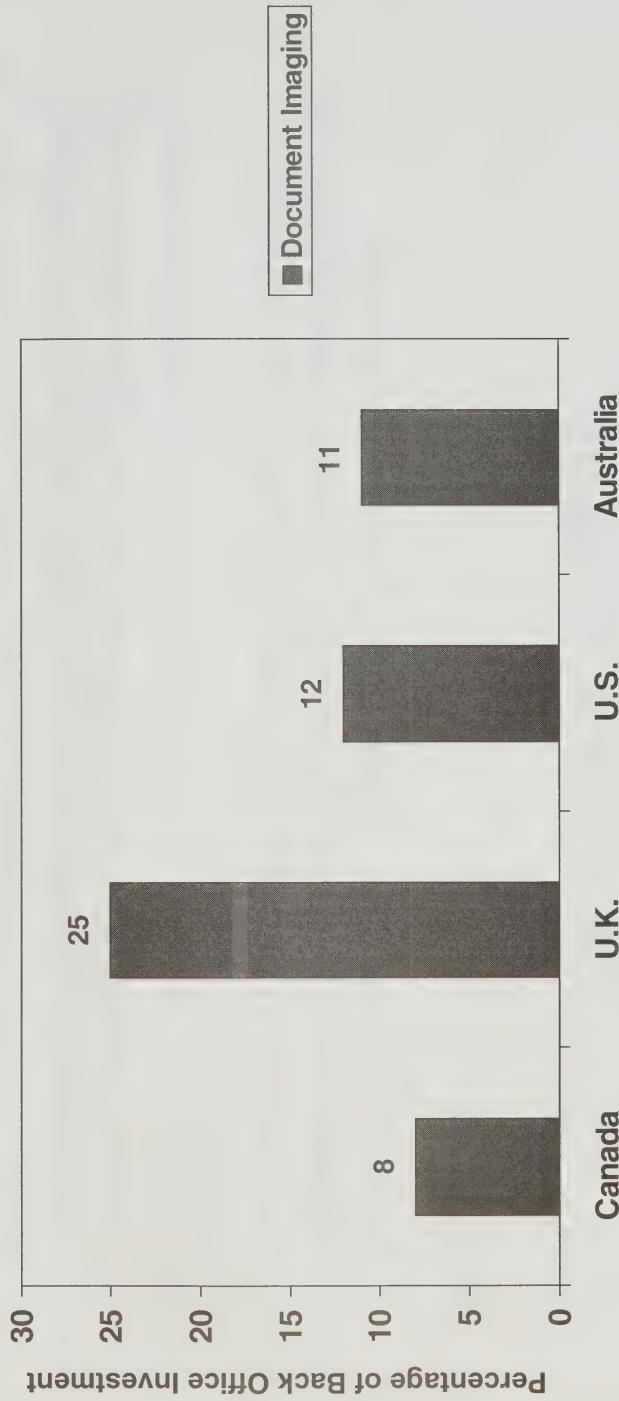
Smart Cards

- Hypothesis:

- ⇒ Regulatory frameworks have not been impediments in the adoption of smart card technologies to date
- ⇒ Structure of Canadian financial services industry enables rapid adoption of smart cards
- ⇒ The stage of development of required technologies, appropriate infrastructure and consumer behaviour have been primary factors in the rate of adoption

Document Imaging

Canadian Banks have invested proportionately less on imaging as a percent of Back Office investments



Document Imaging

- Hypothesis:

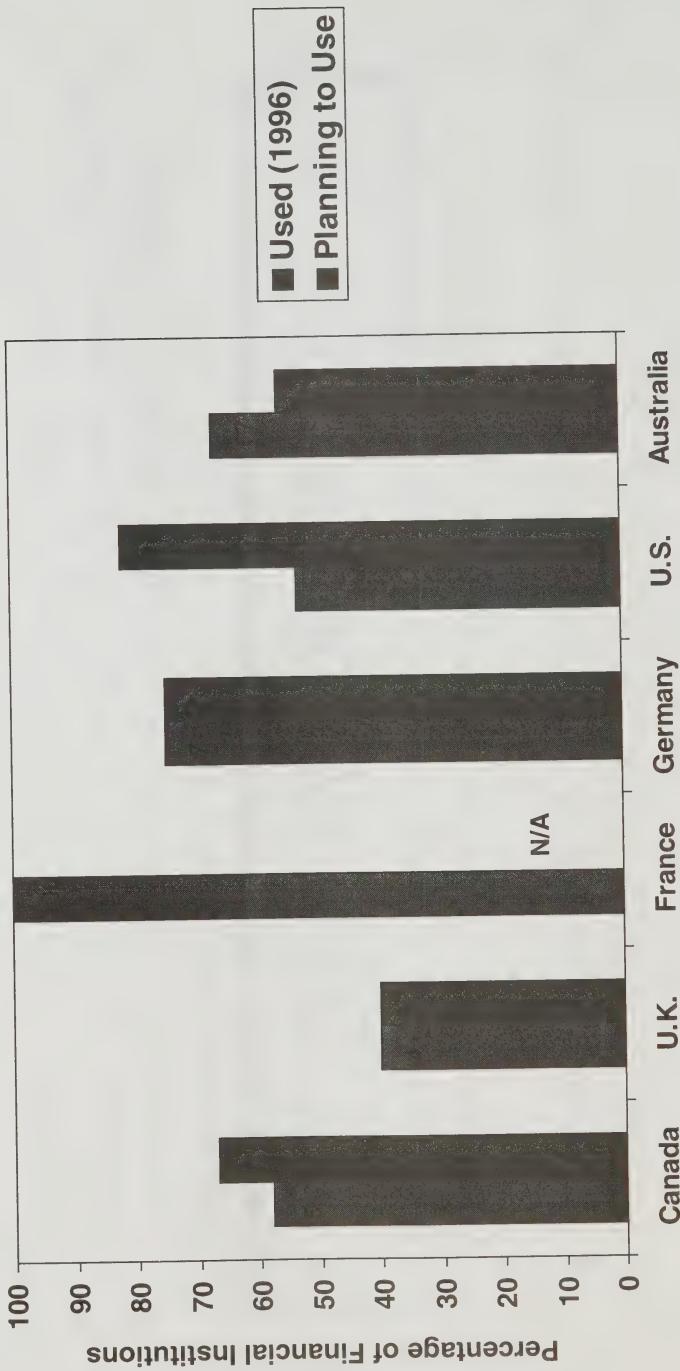
⇒ There is excess cheque processing capacity, a primary application for document imaging in Canada, resulting from the rapid adoption of debit cards and other electronic payment systems in this country

⇒ Excess cheque processing capacity and need for economies of scale prompted three of the big 6 banks in Canada to establish a joint venture for item processing, using the document imaging technology of one of the banks as the base technology

⇒ Regulatory factors have not impeded the adoption of document imaging technology in Canada

Data Warehousing

Canada is keeping pace with the average of the Benchmark Countries in the use of Data Warehousing



Data Warehousing

- Hypothesis:

⇒ Impediments to investment in data warehousing have included:

- degree of sophistication in approaches to marketing and customer segmentation
- investments in necessary technologies and interfaces with underlying legacy systems
- concerns over privacy and data protection

⇒ Restrictions in the transfer of information between subsidiaries impedes the broader implementation of data warehousing applications

Overall Conclusions

Overall Conclusions

- Globalization is reducing timing differences in technology adoption between countries
- The 5 benchmark technologies reviewed are in early stages of development, and to date, regulatory issues have not impeded adoption
- Primary impediments to adoption include scarcity of visionary IT resources, customer behaviour and attitudes regarding privacy and security, existing technological infrastructure (merchant terminals, interoperability), human resources and return on investment

Looking Back

- Canadian banks have a history of being at the leading edge in implementing new technologies
 - ⇒ cheque clearing
 - ⇒ ABM - SCD, Bill Payment, Deposit
 - ⇒ POS Debit
 - ⇒ Smart Cards (pilots 1997 and launch in 1998)
 - ⇒ PC/Internet Banking (Sched I Banks, Credit Unions, Trust Companies)
 - ⇒ Call Centres

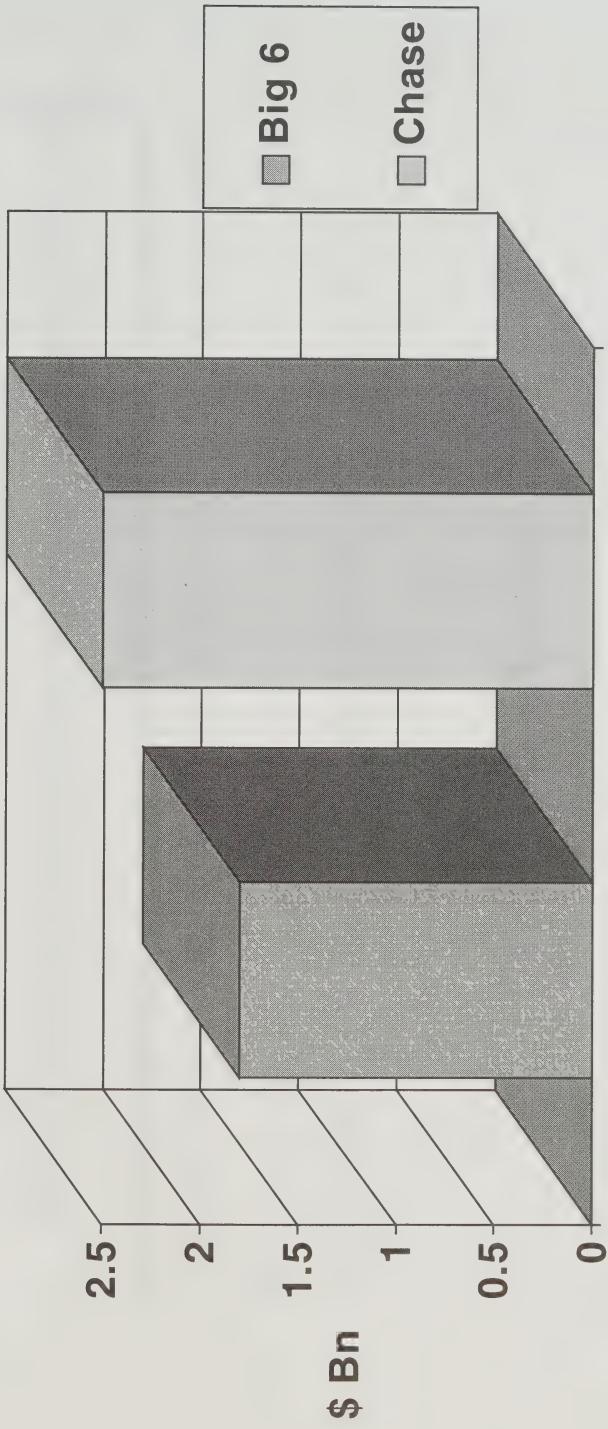
Looking Back

- The key enablers to rapid adoption of technologies in Canada have been:
 - ⇒ a public that is relatively comfortable with new technologies
 - ⇒ a competitive banking environment
 - ⇒ a willingness by the banks to work together to adopt common standards (e.g. SCD)
 - ⇒ a strong, national banking system with sufficient scale in the major banks to allow investment in new technologies

Looking Forward

- Leadership in application of technology is seen as a strategic imperative by the financial services industry
- Globalization and consolidation in benchmark countries will make it more difficult for Canadian banks to keep pace going forward
- Canadian banks are facing increased competition from larger FI's and smaller niche players focusing on technology

**Chase's 1996 IT budget of \$2.5 Bn Cdn
exceeded the total 1996 IT spending of
the Canadian Big 6 banks**



Looking Forward

- Regulatory factors that can impact adoption of technology include:
 - ⇒ regulations that restrict the size of an institution and thereby funds available for investment in new technologies
 - ⇒ regulations which facilitate the adoption of E-Commerce and related technologies

Implications for Regulation

Regulatory Policy Implications

- Existing laws and regulations need to be adjusted so that they are technology neutral
- Regulate only where necessary. Significant policy issues are:
 - ⇒ Access, Safety and Soundness of Payment System
 - Stored Value Cards - issuance restricted to depository institutions
 - Cross border delivery of financial services
- ⇒ Legislation to facilitate E-Commerce
 - Digital Signature
 - UNCITRAL Model Law

Regulatory Policy Implications

- Some Features of Electronic Commerce point to the Need for Self-Regulation and Private Regulation
- Alignment with and participation in global inter-governmental efforts should be encouraged. For example:
 - ⇒ Clinton Framework for Global Electronic Commerce
 - ⇒ OECD initiatives

